THE

GEOGRAPHICAL MAGAZINE.

AUGUST, 1874.

THE CAMERON EXPEDITION.

THE interest of African exploration now centres on the single-handed expedition of Lieutenant Cameron. We have in previous numbers* followed this gallant young naval officer along his difficult and tedious route from the coast to Unyanyembe, where he and his companions were brought to death's door by repeated attacks of fever. There is something very noble in the devotion of Cameron, who thus, without pay or any other selfish inducement, risked his professional career, his health, and his life to serve and succour the great explorer of whom he had heard much, but who was to him a perfect stranger. Livingstone's men very naturally supposed that it must be a son who had gone through so much to succour their old master; and, indeed, no son could have shown more devotion. Nothing daunted by repeated attacks of fever of unusual severity, he remained steady to his resolution to complete the service that had been entrusted to him, when the news reached him that Dr. Livingstone was no more, and that his servants were approaching with his body and effects. We have, in a previous number, expressed our hearty appreciation of the noble and loyal conducts of these men.† They had, with an affectionate zeal, which is deserving of the highest praise, carried the body and all the explorer's papers over the great distance from the place of his death, and it was most providential that an English expedition was at Unyanyembe to furnish supplies, and take charge of the precious freight in the equally hazardous journey to the coast. The caravan was within a few marches of Unyanyembe, the men nearly naked and starving, when one of them brought in the tidings, and Cameron sent him back with a bale of cloth, to buy provisions, so as to continue the journey. As soon as Livingstone's men reached Unyanyembe, they gave way to the temptations of the place, and a set of orderly fellows was, for several days, converted into a drunken and riotous mob. This was natural, but it shows how entirely the safe transmission of Livingstone's body and effects depended on the presence of Lieutenant Cameron's expedition. That officer at once assumed all responsibility; and, in a letter dated December 4th, he instructed Lieutenant Murphy to take charge of the Livingstone caravan to the coast. Lieutenant Cameron had given Livingstone's men ample supplies for the journey to Zanzibar, but it nearly all went in drinking at Unyanyembe, and, when he gave charge to Lieutenant Murphy, it was necessary to furnish more. It took several days to get the men together, but at last Lieutenant Murphy started, with Dr. Dillon; and, by a clever *ruse*, the former officer succeeded in carrying his precious freight through the Ugogo country. He was thus enabled to effect the march without opposition. When Livingstone's men were again on the march they behaved well, and were very tractable. The party left Unyanyembe on the 9th of November 1873, and on the 17th poor Dillon died. His companion pays a just tribute to his memory: "A skilful and zealous officer, and a highly accomplished scholar, a firm and steadfast friend, of unsullied honour, and one who ever protected the weak against the strong, in him the country lost one of her most valuable servants."

Cameron was now alone. Livingstone's men had reported to him that a journal and map belonging to the Doctor had been left at Ujiji, and that his desire was that they should be recovered. It now appears that this map is one of the utmost importance; being that of the unknown region between Kitanguli on the coast and Lake Nyassa. Without it the record of the great explorer's discoveries would be very incomplete; and its recovery is a most useful geographical service. It seemed to the young explorer that their recovery was a sacred duty, and he also considered himself bound to do his utmost, with the means at his disposal, to further the cause of geographical discovery. With these objects, but still suffering acutely from the effects of fever and ophthalmia, he broke up from Kwihara (Unyanyembe) on the 11th of November, and made a short march to a village called Mekwendwa. For many days he was retarded and harassed by the desertion of *pagazi*, or

* The previous history of the Cameron Expedition will be found in an article at p. 263 of the December (1872) number of *Ocean Highways*, announcing its despatch; and in Log Book Notes at p. 352 of the number for February 1873; p. 386 of that for March, p. 31 of that for April, p. 122 of that for June, and p. 211 of that for August 1873. These Notes report the progress of the Expedition. In the number for August 1873 (p. 199) there is an article giving an account of the march of the Expedition from the coast to Rehenneko; and in that for January 1874 (at p. 416), there is another article with a narrative of the march from Rehenneko to Mdaburn in Ugogo. In the number for March 1874 (p. 488) there is an article with an account of the sufferings and detention at Unyanyembe. In the number of the *Geographical Magazine* for April 1874 (p. 35) there is a Log Book Note on the results of Lieutenant Cameron's geographical work as far as Unyanyembe; and in the July number (p. 171) another announcing his arrival at Ujiji.

† See *Ocean Highways* for March 1874, p. 486.

porters. Altogether forty days were wasted from this cause, besides the amount of wages. It was not until the 2nd of January 1874, that the journey regularly commenced.

The route taken by Cameron was at first south-west from Unyanyembe to the Ngombe River, and thence west to Uvenda. It was thus south of Burton's route; and a new line of country was traversed, by which light was thrown upon the drainage system of the southern part of the basin of the Malagarazi. Stanley had made a much wider *detour* to the south to avoid the hostile negro chief Mirambo; but the English officer did not allow any consideration of this kind to turn him from his course, which, therefore, lies between those of Burton and Stanley.

Mirambo was, however, as powerful and formidable as ever. The Arabs were doing nothing against him, there being a dispute as to who should take the command. It was rumoured that the negro insurgent intended to attack Cameron's party, in which case he would have had a warm reception. Signs of his inroads—deserted villages and abandoned cultivation—were visible on the route. Nearly all the province of Ugara is now tributary to him, and he is far more powerful than the Arabs represent him to be. He gets all the supplies he needs from the villagers, who are his allies in secret, whilst they openly profess friendship for the Arabs; and many disreputable Arabs are quite ready to furnish him with anything he requires. Lieutenant Cameron describes the fields no longer tilled, and the charred remains of the huts, and says—"it is indescribably saddening to pass through places which once were the homes of a happy and contented people, now all either dead or slaves, and to reflect that this devastation is all due to the unprincipled coast Arabs. The 'Omân Arabs are far superior to those of Zanzibar, and if they alone had penetrated to the interior the state of the country would be very different from what it is now." Cameron was told by one of Mirambo's followers that if his had been an Arab caravan, it would have been attacked, and would not have been allowed to pass; but that it was known that the English did no harm, and only came to see the country, and that they might, therefore, pass without hindrance. No large caravan had traversed the route for many years. It is to the south of Mirambo's territory, but Cameron believes, from what he heard and saw, that the insurgent chief would have let him march through his own country, if the request had been made.

After leaving Shikurah, the furthest southern point, whence the road turned west, the prospects of the expedition were bright and hopeful. The young traveller felt better in health and stronger than he had done for months. The weather was pleasant, and he was able to step out himself, and so keep all his men on the stretch. He describes the country, between Shikurah and the river Ngombe, as lovely though perfectly flat. There are open glades of bright green grass, interspersed with numerous clumps of trees, and *bosquets* of shrubs. The Ngombe stretched away in long reaches to the horizon, as wide as the Thames at Abingdon. Water lilies were abundant, and the views of the reaches, with green turf down to the water's edge, were enchanting. The clumps of fine trees were disposed as if planted by a landscape gardener, most of them growing on little eminences, but some on the water's edge, with their branches dipping in the stream. The Ngombe is a tributary of the Malagarazi.

Marching westward from this river over a dead level, they came, after four hours, to a small isolated hill, on the western side of which was the village of Kwatosi. During the day they were met by some men sent out by Sultan Taka, the chief of this Ugara country, to whom it was necessary to pay a *mhongo* or black mail of 22 *doti*. Cameron did not go to the chief's village, as it was off the road; but he was accompanied by some of the chief's men to frank the caravan through, without paying more *mhongo*. The country looks as level as a billiard table, and is covered with one mass of jungle; the villages being built in the densest parts, rendered even thicker by being planted with milk bush. In spite of the apparent flatness, the land gradually rises from Shikurah, about 400 feet in 60 miles of the westward march. As the party advanced the country seemed very fertile, and once to have been well cultivated, but everywhere there were the signs of ruin caused by the Arabs. On the 15th of January, Cameron encamped near Liowa's village of Kwikura, where another *mhongo* was settled for 18 *doti*. The people cultivate sweet potatoes in large quantities, which seem to be their chief article of food. It became advisable to leave the main road, as it was blocked up by a colony of runaway slaves of the Arabs, who have muskets, and plunder all they can, occasionally joining with Mirambo for an attack on their former masters. These runaway slaves have been settled in this place for many years, and were there in the time of Burton and Speke. But they have been recently reinforced by several of the armed slaves whom the Arabs sent against Mirambo, and are of course more formidable than ever.

Here Cameron calculated, by dead reckoning, that he was 30 miles S.E. by S. ½ S. from Mpeti, on the Malagarazi, which agrees well with Burton's positions. On the 17th there were hills in sight to the westward, soon obscured by a tremendous fall of rain, the sound of which could be heard, like that of a great waterfall, before it reached the caravan. The country was rising gradually, and suddenly the party came to a steep dip, with outcrops of granite, almost precipitous in some parts, and several brawling torrents rushing over and among the rocks. They unite to form a stream called the Mtumbo, a tributary of the Sindé, which falls into the Malagarazi. The water was beautifully clear and bright, and in front, to the westward, there was a high range of hills. The Mtumbo has its rise in the southern part of Utendi, and, receiving many smaller streams on either side, unites with the Sindé close to its junction with the Malagarazi.

After the 19th the march was through a moist country, with tremendous rain storms. Unluckily, Cameron was nearly disabled by a severe centipede bite on the leg, and was obliged first to ride a donkey, and afterwards to be carried for some distance. The pain was intense, and prevented all rest at night.

On the 22nd the route led over a country covered with sheets and blocks of granite, or more probably gneiss, all the streams having their western banks rocky, and their eastern sides of earth. The country is well wooded and fertile, the drainage being to the Mtumbo. On the 23rd a river intercepted the route, which was 30 yards wide, and 7 to 10 feet deep.

This brought the india-rubber boat into play, and everything was got across without accident in three hours. The route lay along spurs of hills to the south, until, in the evening, they reached a large plain. Cameron says, "I know not what we should have done without the boat to-day, or what we should have done at all without the two bell-tents, all of which we owe to Major Euan Smith's thoughtful kindness."

At this point provisions began to run short. The men were hungry, and went off in search of a village, while Cameron had had no meat for several days. The reason of this was that he had respited a goat which was bought for food. The little creature was so tame as to come and eat out of his hand, and he could not find it in his heart to have it killed. She was named *Dinah*, made great friends with the faithful dog *Leo*, and became so tame as to insist upon coming into the tent, and on to the bed. The dog and goat marched together, and swam side by side across the rivers and marshes in loving company. The people in the villages all wanted to know what medicine Cameron gave the goat to make her so fond of him.

On the 25th, after crossing another river in the boat, they encamped on its western bank close to the village of Ma'n Como, the chief of Kowende (Uvenda), 3573 feet above the sea. Further on the march was through mountainous country, with precipitous sides of granite rock. The hills are clothed with trees to their summits. The route led to the top of a ridge, whence there is a splendid view, stretching over rocky hills, expanses of emerald plain, and masses of sombre forest. Thence the path led over the tops of the hills, along a ridge, rising and falling, and often not more than 100 yards wide, with precipitous descents on either side. A tremendous downpour of rain in the afternoon covered the hill sides with running water, little torrents being formed at every 10 or 15 yards, which reminded Cameron of the streets of Catania, after a thunderstorm on Mount Etna. Half an hour after the storm was over the water had nearly all run off. If he had been able to walk Cameron would not have cared, but it was unpleasant to have to sit in a chair and be rained upon; and the pain from his leg was becoming more intense.

In this region of Uvenda the people are afraid to build their villages in the plains, as the Arabs seized them for slaves, and their neighbours, the Wavinza, do the same, for sale at Ujiji. Consequently all the level strip along the Malagarazi, as far east as Mpeti, is occupied by the Wavinza, who thus have the whole command of the ferries; while the Uvenda people are driven up into the hills. The villages are all small, the largest not containing more than seventy or eighty men; and every village head-man considers himself independent. The villages are built on the tops of precipices, or among rocks, as some defence against the slave-dealing Arabs and Wavinza. All this Uvenda country was populous a few years ago, but the infamous slave trade has depopulated it almost entirely. Cameron could obtain little food, and he was told that he was only given that because it was a white man's caravan. The people declared that they would sooner destroy their food than sell it to the Arabs. Descending from the ridge the party reached a well-cultivated valley, where the fields were fenced with strong fences of tree trunks in double rows, with the interstices filled in with brambles. The scenery is lovely. Many of the villages are built against the rocky sides of hills, and the people often live in regular caves.

On the 2nd of February they reached the river Sindé, and crossed it on a natural grass bridge. This kind of bridge turned out to be quite easy, and not at all dangerous, as Cameron had been led to expect. Part of the middle was so firm that it appeared to be solid ground, especially as earth had lodged on the top of the grass and ferns. The river is about 100 yards wide, and the growth, forming a natural bridge, continues for about half a mile. The hippopotami pass from one end to the other, underneath.

The hill country ends on the right bank of the Sindé, and on the other side is the plain inhabited by the Wavinza, which is well cultivated with *sim sim*, sweet potatoes, yams, and Indian corn. The people of the village of Itambali, the first halting-place beyond the Sindé, were very civil and obliging, and as soon as the tent was pitched some of the head-men brought the Uvinza chief, a child of eight years, to visit the English officer. Here it became necessary to settle the *mhongo* to be paid for passing through the Uvinza country. The hills come to an abrupt termination on the right banks of the Sindé, forming bluffs and capes rising out of the plain. Cameron had hitherto been unfortunate in obtaining sights, owing to the constant clouds and rain, but at Itambali he obtained two latitudes by altitudes of *Capella* and *Canopus*, the mean giving a result of 5° 15′ 56″ S.

On the 6th and 7th of February the march was continued to the banks of the Malagarazi. The people of Uvinza were very friendly, but bitter against the Arabs. Cameron laughed at and chaffed them when he found a large crowd staring, and they laughed also, and seemed to enjoy the fun. They like to see what is going on, but are not rude or obtrusive, and will go away at once if they are asked to do so. Cameron thought them a great deal better behaved than the people in an English village would be, if a black man came travelling about in the same way there. He had now reached Ugaga, and thus, for the first time, came on the route traversed by Burton and Speke in 1858. Cameron found the height above the sea, at Ugaga, to be 3048 feet.

All day of the 8th of February Cameron was detained, discussing the terms for being ferried across the Malagarazi River; and there was an alarm that Mirambo, who had been close to at noon, was going to attack them in the evening. The river was 30 yards wide at the ferry, running about four knots south-west. On the 10th the canoes arrived. They consisted of four long hollow logs of wood, about 18 feet by 2, which Cameron described as about the roughest arrangements he had ever seen in the way of boats; and two about 20 feet long, made of a single piece of bark, the ends being sewn up, and the gunwales stiffened with a batten laced on them, and kept apart by other sticks placed athwart the ends. They carried two or three men and their loads across at each trip, but that was as much as they could do, the water being within 3 or 4 inches of the gunwale. The crossing occupied five hours, from 8 A.M. to 1 P.M.; and it became necessary to halt at Mpeti, the first village on the right bank. Here Cameron obtained another latitude, by observations of the stars *Capella*

and *Canopus*, 5° 7′ 37″ S., which only differs 15″ from that taken by Speke at the same place, in 1858.

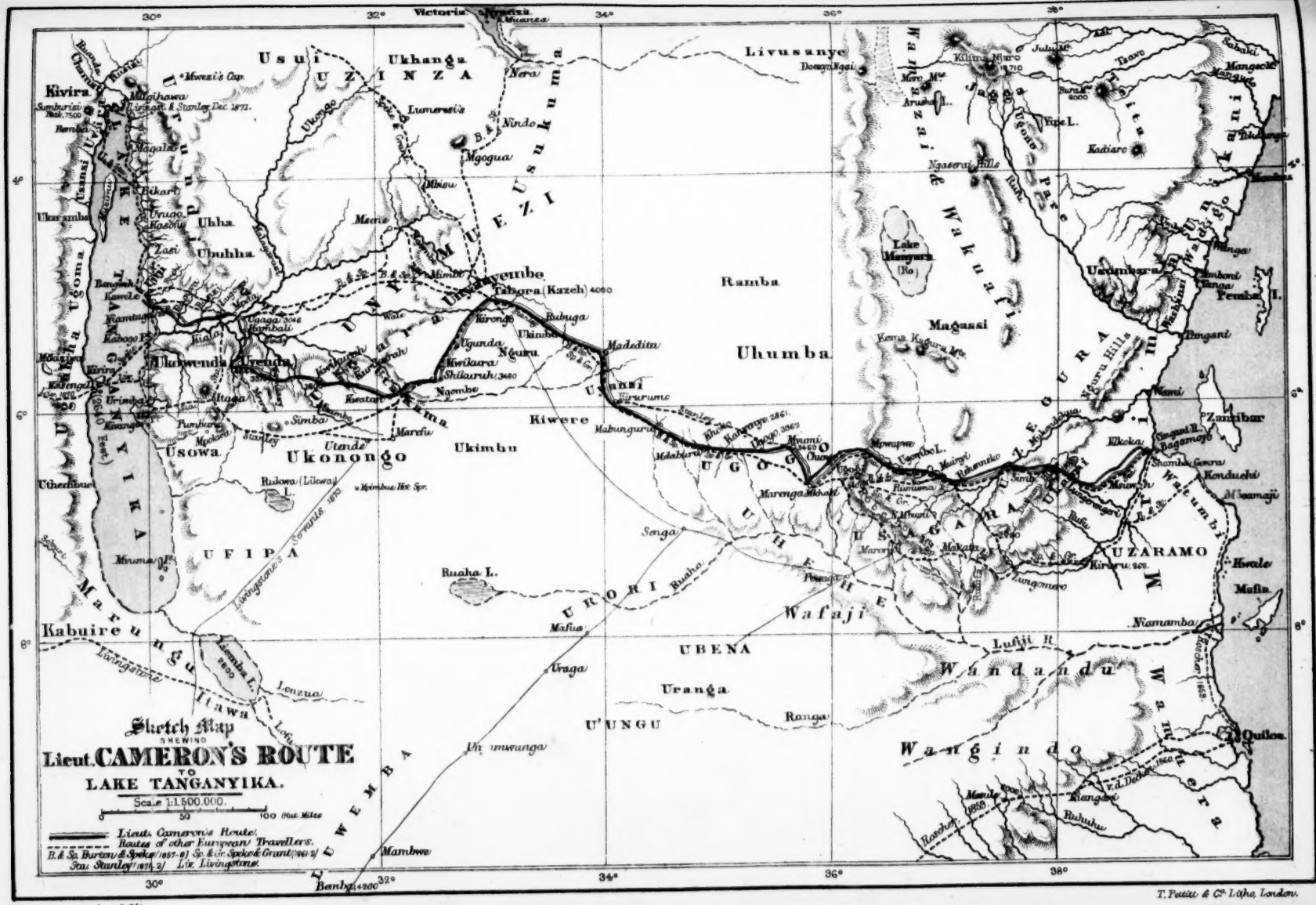
As he continued his march, Cameron received news of Mirambo burning and destroying villages all round him; and many deserted huts and signs of abandoned cultivation were passed. On the 13th he reached Luguwa, the western limit of Uvinza, and entered the Ukaranga country. Here a sad event occurred, which the young explorer felt very much. Leo, the faithful dog which had marched with him all the way from the coast, was brought in, and just had time to look at his master and wag his tail, when he died. He was quite well in the morning, and must have been bitten by something, for his tongue and mouth had changed colour, and he was stiff within five minutes after his death. The villages in this neighbourhood are principally supported by the manufacture of salt. The black soil is full of it, which they wash and filter, and, after evaporating the water, very good white salt is obtained. The people come from a distance to get the salt earth, and conduct the manufacture in their own villages. Bombay, the veteran companion of Speke, had successfully brought donkeys with loads all the way from Unyanyembe, and at Luguwa a small foal was born.

On the 15th the river Rusugi was crossed. There was close jungle all the way down a valley, flanked by low, rocky hills; but this growth is quite recent, there having been villages and cultivation in the valley only a few years ago. They encamped 3 miles beyond the Rusugi, the little donkey being carried part of the way. Next day the Ruguva was passed, where they heard an elephant blowing in the jungle, but could not get sight of him. On the 19th they advanced into a country very much broken into hill and dale, with extensive bamboo growth; and it was found that the land road to Kawele (Ujiji) was impracticable on account of the rains; the river Ruche being very swift and swollen, and the mud deep. At length, on the 21st, Lieutenant Cameron got his first sight of lake Tanganyika, a grand expanse of water bounded by the distant mountains rising from the western shores. Another two hours' march, partly over a flat, intersected in every direction by hippopotamus paths, brought the caravan to the shores of the lake, where canoes were waiting. Cameron describes his impressions on first seeing the great lake, in a few graphic sentences jotted down in his rough note-book. Burton's picturesque and glowing description of the same view, which he first saw almost on the very same day of February, sixteen years ago, will be found at p. 213 of his *Lake Regions of Central Equatorial Africa*.

The place of Cameron's embarkation appears to be Burton's port of Ukaranga, separated from Ujiji by the mouth of the Ruche. The canoes were fine large boats; and in an hour and a quarter they brought Cameron and his party to Kawele (Ujiji), where he was hospitably received by the Waswahili and Wamrima inhabitants, traders and settlers of Arab extraction, from the coast. He was the first sailor and the first surveyor who ever navigated the waters of lake Tanganyika. The head-men established their English guest in very comfortable quarters. The market is well supplied with excellent fish and fruits of various kinds, bananas, pomegranates, custard apples, and sweet limes: tomatoes, yams, sweet potatoes, pumpkins and cucumbers are among the vegetables of Ujiji; and Indian corn and rice form the breadstuffs. Fowls and eggs are plentiful, and there are also cattle and sheep. The Ujiji traders were extremely cordial, and on the 24th Cameron went with some of them on a shooting excursion to the island of Bangwe; where he got a good round of angles. On February the 26th Dr. Livingstone's effects were handed over to him, including a journal and the valuable map, which he was about to transmit, by a secure hand, to the coast. On the 27th he obtained a good set of lunar observations for longitude, meridian altitudes for latitude, and observations for height from four aneroids, and seven boiling-point thermometers. His observed longitude is 30° 4′ 30″ E.; agreeing well with his longitude by dead reckoning, which was 29° 59′ 30″ E. His latitude of Ujiji, by observation, is 4° 58′ 3″ S. The height of lake Tanganyika above the sea is 2754 feet. These observations are extremely valuable, as they verify or correct those of Speke and Livingstone. Speke's longitude of Ujiji was 30° E., but it was taken with a star out of distance. His latitude was 4° 54′ 56″ S. Speke made the height of the lake above the sea 1844 and Livingstone 2884 feet.

All the Waswahili traders to the Manyuema country make Ujiji their head-quarters during the rains. They reported that travelling to the westward of the lake was impracticable until the beginning of May. Lieutenant Cameron, therefore, determined to devote the two months of March and April to a thorough examination of lake Tanganyika, for which purpose he obtained a large boat with fourteen oars and a sail; and the important geographical problem connected with the drainage of this expanse of fresh water will be investigated, for the first time, by a sailor and a trained surveyor. In May he intended to press onwards, with a party of carefully selected men, to the Lualaba; but it is possible that Sir Samuel Baker's hypothesis may be correct, and that the Tanganyika and Albert Nyanza are one water. In that case, and if in the course of his investigations he sees reason to take this view, Lieutenant Cameron may turn his course northwards, so as to connect his work with that of Colonel Gordon. Under any circumstances, he is probably on the threshold of important geographical discoveries.

Lieutenant Cameron has shown that he possesses many of the highest qualifications of an African traveller. He is well known as one of the best pedestrians in the Navy. He is a trained surveyor, and can both observe accurately for latitude and longitude, and work a traverse with precision. He has good topographical insight, and not only describes the physical aspects of a country, but applies reasoning from observed facts to solve geographical problems which are beyond the horizon of his actual vision. He received some hints respecting the observation of geology from his friend Mr. Prestwich, and has made botanical and other collections. He derives intense enjoyment from fine scenery, and is not without some literary skill in describing it. As a linguist he had already distinguished himself in his own profession, having passed as an interpreter; and he soon mastered the Kisuahili language. He is indefatigable and unceasing in his endeavours to collect information of all kinds from the people along his line of march; taking it for what it may be worth, for future comparison and scrutiny. He is a favourite among the natives, understanding them thoroughly, and having a fellow feeling for them, which they see


Sketch Map
SHEWING
Lieut. CAMERON'S ROUTE
TO
LAKE TANGANYIKA.
Scale 1:1,500,000.
50
100 Stat. Miles
Lieut. Cameron's Route.
Routes of other European Travellers.
B. & Sp. Burton & Speke (1857-9) Sp. & Gr. Speke & Grant (1861-2)
Stan. Stanley (1871-2) Liv. Livingstone.
Victoria Nyanza
Usui
Ukhanga
UZINZA
Livusanye
Kivira
Magihawa
Simbaniri
Bambarre
Mwezi's Cap.
Magalala
Bikari
Uhha
Zazi
Uhuhha
Uvinza
Ukaramba
Usansi
Ugoma
Ukonongo
Usowa
Utende
Uthembue
Rukwa (Lilowa) L.
Kimbua Hot Spr.
UFIPA
Maruma
Kabuire
Marungu
Itawa
Lenzua
Lofu
Lake Tanganyika
Mamba
Bamba 4200
Uwemba
Nera
Lumesse's
Nindo
Mgogua
Mbiau
Mwere
Mimbe
Tabora (Kazeh) 4000
Ramba
Uhumba
Magassi
Lake Manyara (Na)
Kenia Kegura Mts.
Kiruruma
Kiwere
Ukimbu
Mabunguru
Mdabura
Mpwapwa
Uzaramo
Kikoka
Zanzibar
Pemba I.
Uzigua
Usagara
Ugogo
Unyanyembe
Kwihara
Mirambo
Kaze
Simba
Marefu
Mpokwa
Stanley
Kwihara
Ruaha L.
Ruaha R.
Rufiji R.
Wafaji
UBENA
Uraga
Uranga
U'UNGU
Ranga
Mafua
Lufiji R.
Wahandaru
Wangindo
Quilos
Kiranga
Ruhuhu
Mamba
Niamamba
Kisale
Mafia
Kilimanjaro 19710
Mawenzi Mt.
Jagga
Taveta
Kadiaro
Ngaserai Hills
Pare
Usambara
Pemba I.
Mangani
Wami
Kikoka
Kisegal R.
Bagamoyo
Shamba Gwira
Kenduchi
Mcamaji
Mkata
Kiruru
Lungonero
Makata
Mpuapua
Mirambo
Kwihara
Simba
Kaze
Mpokwa
Marenga Mkali
Rubuga
Ugunda
Ukimbu
Madedita
Ngambe
Kwikuru
Shilauru
Ngaura
Kwihara
Kwihara
Kwihara

and appreciate. Nowhere is patience more tried than in travelling with African *pagazi*. But they must be led, not driven, if progress is to be made; and the kindly tact and judgment of the English naval officer is more effective than all the violence and slave-chains of which we heard so much two years ago. Yet Cameron is vigilant in the detection of theft or intended desertion, and prompt in punishing such delinquencies. The men whom he engages for service are told off into messes, and the loads are periodically examined. The pluck and determination by which Cameron has hitherto overcome obstacles which would have daunted most men, are now well known. At the outset the difficulties which surrounded him were of a peculiarly disheartening and embarrassing character, and at Unyanyembe were superadded attacks after attacks of fever of a specially severe type, accompanied by ophthalmia. Yet the gallant young explorer remained undaunted through it all; and he has continued to push onwards with the fixed resolve that the expenditure incurred on his expedition shall bear good fruit, in the shape of valuable geographical exploration and discovery.

Such is the man who is now at the advanced posts of the known region of Africa, and on the threshold of discovery. It would be deplorable if, for want of funds, his most promising career was now checked. It is not in the nature of Britons to leave a fellow countryman, who is engaged on a duty the performance of which will redound to the credit of the nation, to his fate. He is doing his work zealously and nobly; never having once faltered in his determination to fulfil the commission entrusted to him. We very earnestly appeal for support for Lieutenant Cameron; without which he will be placed in the greatest difficulty and danger. A sum of at least 2000*l.* is needed; and a subscription to meet further expenses has been opened. Subscriptions may be paid for the CAMERON EXPEDITION FUND, to Messrs. Ransom, Bouverie and Co., 1, Pall Mall East, S.W.

THE LUFIJI RIVER AND THE COPAL TRADE.

THE river Lufiji, though entirely unknown beyond its delta, is one of the most important rivers on the east coast of Africa. Rising, as is supposed, in lake Rwaha, in about the longitude of Unyanyembe but far to the south, it receives the drainage of all the southern slopes of the Usagara and Ugogo country, along which Burton's route passed from the coast to Unyanyembe, and falls into the sea opposite the large island of Mafia, about 100 miles south of Zanzibar.

Burton collected all that was known of the Lufiji, which, in its upper course, is called the Rwaha River; and he observed that the exploration of its delta was still a desideratum.* This desideratum has now been supplied. In 1873 Dr. Kirk and Captain Wharton, of H. M. Surveying Ship 'Shearwater,' explored the Lufiji Delta† in a steam launch; and this year it was again explored by Captain Elton, First Assistant to the Political Agent at Zanzibar, who has also furnished some very interesting information respecting the *copal* diggings to the south of the port of Dar-es-Salam.

* *Royal Geographical Society's Journal*, xxix., p. 44.
† *Royal Geographical Society's Proceedings*, January, 1874.

The *Msandarusi*, or copal-tree, according to Captain Elton, is largely scattered over an extensive tract of country, in the Mrima or coast region. This tract lies along both banks of the Lufiji, and extends from the mountains to the sea, a belt from 30 to 35 miles wide. Throughout these limits immense quantities of the semi-fossil are dug up by the natives, and this constitutes the most lucrative commerce of the Indian settlers at the small trading ports. Further south, beyond the Lufiji, there is a break in the supply, attributed by Captain Elton to the surrounding slave traffic, which rapidly drives legitimate commerce out of its course, but also affected by the increased difficulties of communication caused by the marshy swamps which here fringe the coast more deeply than above the Lufiji. Beyond Kilwa copal again appears, and is largely bought up, in tranquil times, at the numerous trading stations which dot the sea-board down to the Rovuma River.

The copal-tree is described by Burton as a large tree, the towering bole of which has formed canoes 60 feet long. The bark is smooth, the trunk of a yellowish white tinge, rendering the tree conspicuous amid the dark African jungle growths, and is dotted with exudations of raw gum, which is also found scattered in bits about the base. The forests, called *kiregesi*, contain many *msandarusi* or copal-trees, and between them, in the broad transverse glades which always intersect African woodlands, some of the finest fossil-gum is dug. This never reaches the trader, however, without a large admixture of the copal from the neighbouring trees, and the contents of the digger's basket are made up with wet sand and small stones, in order to give it a little extra weight. The chief centre of supply is the Kwale district, where there are eleven stations for carrying on the copal trade. In the early morning strings of natives are seen on the paths, each party led by a few men armed with old muskets and bows and arrows, and consisting of women and lads, carrying copal baskets. Except during the very dry season, these arrivals take place daily, but there is no organized system of working. The Indian traders do not venture to send out parties of their own, for each village and each working is represented by a head-man, and the natives are only too ready to unite against the slightest encroachment on their monopoly. The "trade union" system is here represented in its strongest form.

Below 4 feet no gum is found worth taking, and very few diggers go beyond 3 feet in search of it. The trade appears to be surrounded by many difficulties. The Indian trader, on the Mrima coast, has many extortions to contend against, and heavy duties to pay; besides the continual haggling with the natives, competition with his neighbours, and a perpetual round of coast fevers. The local village head-man extracts a ground rent from him; and he has to pay an arbitrary per-centage on his profits, and 20 out of every 100 *frasilahs* of copal shipped as an export duty. The cost is from 3 to 5¼ dollars per *frasilah* of copal, varying according to the season of the year, and at Zanzibar the merchants buy at from 7 to 8 dollars. Yet, in spite of all difficulties, the trade prospers; and Captain Elton is of opinion that the inexhaustible supply of copal, under a settled rule, and with systematic working, would furnish the means of supporting a far larger community than that which is now sparsely scattered along the coast.

In old days the trees would appear to have lined the shores, but the extent of the ancient forests can now only be estimated by the area of the present workings, and by the positions of the existing *msandarusi* which are found away towards the foot of the low hills bordering the Mrima, and on all the terraced lands sloping down from the ridges to the present sea-beach. *Msandarusi* is the true or ripe copal, the produce of vast extinct forests, and buried at depths beyond atmospheric influence. The raw or tree copal is called *Chakazi*. It is little valued in European markets, but is exported to Bombay and China. A most interesting account of copal and the copal trade is given by Captain Burton in his *Lake Regions*.*

After visiting the stations of the Indian copal traders in the Kwale districts, Captain Elton entered the Simboranga mouth of the Lufiji River in January 1874; and then examined the other mouths. The various embouchures of the Lufiji are the Simboranga, Saninga, Twana, Gumba (called Mzinga on Captain Wharton's chart) Kiazi, Mbwera-barra, Jaja, and Mbombwe. Of these the Simboranga, Bamba, and Jaja appear to be main streams; of which the Simboranga is the broadest and the most used. The low mangrove-clothed country along the sea-face of the delta has many villages, and is thickly populated by a race who, during the inundations, must live half their time in the water.

Captain Elton commenced his examination of the Lufiji from Samanga at its mouth, where the Banyans tried to dissuade him from the journey, asserting that the natives of the river were badly disposed and suspicious, and had been worked up by Arab reports against his visit. He paid no attention to this at the time, but he found in the end that there was some truth in what the Banyans had said. He was accompanied by Sub-Lieutenant Pullen, of H.M.S. 'Shearwater,' as a volunteer, who, notwithstanding severe illness, was most indefatigable in taking observations and notes. Leaving Samanga, they proceeded north on the caravan road, and passed through the villages of Kuajo, Murengo, and Furu, which communicate with the sea by creeks, and carry on a considerable trade with the interior. At Murengo two slave caravans were met, one of 200, the other of 100 slaves, but nothing unpleasant occurred, the head-men of the villages coming out as well as the Indians to salute them on all occasions.

From Furu the path strikes through a forest country, and is choked up with coarse high grass and undergrowth. Here, for a considerable distance, no signs of cultivation were seen, water being scarce; indeed, missing the road in the thick brushwood, it was not until near sun-down that they found a muddy pool and made their first meal for the day. A few villages and patches of cultivation then appear, the Matumbwi range to the westward assuming larger proportions until a wide plain is entered, spreading from the low hills towards the distant delta country. Covered with brushwood, and bounded by the blue mountain ranges, now rising to a height of about 6000 feet, the change of scene is abrupt and pleasant, although the narrow path is difficult, and obstructed by ravines and mud holes to such an extent as to make their journey across it occupy two hours, the distance being about 3 miles. Mohoro is then reached, a village on the river of the same name (Pemba Utagiti), surrounded by rich fields of maize and millet, banana and fruit trees. Three Indian settlers carry on a lucrative trade in copal grain, and *sim sim*, the fertility of the district lying between the two rivers being extraordinary. Maize, rice, millet, ground-nuts, &c., are largely cultivated; and, although during a portion of the year the lands are subject to inundation, failure is not remembered, and heavy crops confidently relied upon. Sheep, cattle, and goats thrive, and are bought for export *viâ* Samanga.

Through this land of plenty three hours' march brought Captain Elton and his companion to the banks of the Lufiji, the high, waving Indian corn hiding the river from view. As they emerged on a belt of coarse, thick grass and rushes they first saw it, and were greeted by shouts and screams from the slaves of a caravan which was preparing to cross the ferry. The Arabs took fright at their arrival, and some made for the canoes, driving off the gangs, whilst the others prepared to cover the retreat; however, after a little talking, the leader moved every one away, and, within half an hour, had shipped the whole party (65 in number) into the crazy ferry boat, which charges a dollar for every four slaves taken across.

They then chose a large tree near the bank for a camp, and their men were cooking breakfast, when crowds of natives trooped down from the adjacent villages. In less than ten minutes they were surrounded by about 800 men, more than half of whom were armed with guns, the rest carrying spears and bows, and headed by a man who approached and sat down near the tree. He commenced operations by making a long speech on the merits of the Lufiji tribes (an exceedingly ill-favoured and dirty race, even amongst East Africans), lauding them as a fierce and dangerous people. "Did not the Arabs fear them? Had not the white men in the steamboat turned back to the sea from Fugulia (Dr. Kirk and Captain Wharton)?" He then asked why Captain Elton had come. "To fight with a caravan and interfere with the slaves, and close the road, when the country would be ruined? To take away the trade and the boats? They wanted to know what he could say; they heard there was to be a fight, and they would join the fight."

Finding the man was only a messenger, Captain Elton told him when the chiefs came to see him he would speak, but that he wanted to eat, and could not afford time to talk to him. In the end the three head-men of the country arrived, and, in about three hours after the armed men had been sent away, a complete peace was made and ratified by exchange of presents —blue and white calico and turban cloths on the one side, and rice and vegetables on the other. The old man of the three up to our leaving muttered to himself about the evil days that we should bring on the Lufiji.

Captain Elton and Mr. Pullen struck the river at Mpenbeno, on the only caravan route, a group of villages above the delta, and some 10 miles higher than Fugulia, reached from the sea *viâ* the Simboranga by Dr. Kirk and Captain Wharton. The river here is about 260 to 300 yards in width, with a current running about 2 knots, and, from soundings taken by

* *Royal Geographical Society's Journal*, xxix., p. 435.

Sub-Lieutenant Pullen, R.N., averages 3½, and runs to 4 and 5½ feet in depth at this, the driest season of the year.

The scene was very African; the broad flats, covered with rich crops, glittered in the sun, dotted over with baobabs and fig-trees, here and there a shady grove marking a group of villages; to the north-west rose the lower hills, from which the white smoke of large grass fires stood out against the purple ranges of the Matumbwi Mountains in the background; to the north and north-east the highlands of the Mtote and the coast ridge behind Kikunia were visible; whilst through the midst of the enclosed plain rolled the Lufiji in rapid bends and with one long reach past Mpenbeno. An island with steep banks and covered with brushwood is a prominent feature, and a few sand banks fringed with long rushes, infested, the natives say, with crocodiles, are not promising signs of depth. There are no rocks or rapids to be found for twenty days' journey, where, from the descriptions given me by a man who came from the upper country, the Matumbwi Hills are probably passed through gorges. Hippopotami are rare, and game scanty, owing to the many villages which line the banks far into the interior.

The country is healthy, but suffers from the inundation of the river, when fevers are prevalent. Copal is collected in the neighbourhood, and large quantities of wax; ivory comes down but irregularly, cereals being the produce of the alluvial lands and the mainstay of trade. Large tracts of land exist where the sugar-cane might be grown advantageously, and transport by water could be made available; the Arabs, however, have no hold on the country, the native tribes being in undisputed possession.

From here to Kikunia is called seven hours' journey, and a bearing of the hills, distinctly visible on the horizon, gave the direction of the road which crosses two unimportant rivers, the Nkora and the Rohe. The village of Fugulia is three hours distant in a canoe, six by land according to the natives; and in this case the river must wind considerably, which apparently is the case. Canoes, however, are used only for the ferries, in consequence of the strength of the current. "How can we get them up again," said the Chief, "when they get down? We walk when we travel." Coal is reported to exist five days' journey inland, the seam being visible on the bank of the river. The Indians all believe this to be a true report, and show specimens of the coal, some of which reached Zanzibar, and, I think, even Bombay.

Unless coal was discovered worth the working, Captain Elton does not think that it would be worth while to expend money on the Lufiji. During the dry season, like most African rivers, it is a snare and a delusion; sand banks and shoals and an average depth of from 4 to 5 feet do not look well, even in the driest season, yet, if after a visit to these coal localities, the future looked promising, it would become a question whether steam launches could stem the strong current, and at what seasons and how far they could ascend.

He thinks that no attempt should ever be made to put a stop to the slave caravan route on this river: great exposure and loss of life would be certain, and success, owing to the intricacies of the delta and the opposition of the natives, doubtful.

THE VOYAGE OF THE 'CHALLENGER.'*

III.

IN the October (1873) number of *Ocean Highways*, the narrative of the voyage of the 'Challenger' was brought down to her arrival at Cape Verde Islands, at which place she arrived on the 27th July, last year. Between Madeira and Cape Verde Islands, soundings and serial temperatures had been obtained at about every 100 miles, the deep water continuing close up to the islands; but between the islands of St. Vincent and St. Antonio, Cape Verde's, the soundings indicated a connection by a ridge with shallow water over it.

A tidal current was found between the islands. During neap tides the surface current turned to run north (to windward); three hours after, the tide commenced to rise, and ran for five hours at the rate of one knot an hour. The bottom water turned to run north more than half an hour before that on the surface, and ran 6¼ hours; the water at the bottom, therefore, may be said to be unaffected by the trade wind, which, on a fine day, but following three windy days, was sufficient to retard the tidal movement of the surface 1¼ hour.

Very few supplies were obtainable at these islands, there having been but little rain for three years, and numerous skeletons and even dead bodies of goats seen on the plains bore evidence to the precarious existence of life.

Captain Nares having been informed that a trade in pink coral existed from Porto Praya, St. Jago, a boat was sent to dredge over the locality in which it was said to be found, and a few specimens of red coral, similar to that common in the Mediterranean, were obtained, but no pink coral. The same temperature (52°) was found at the depth at which the coral grows, viz., at 80 fathoms, as that in which it exists in the Mediterranean, and which had not been found at the same depth further north. From this

* Much of the information contained in this paper is derived from the *Extracts from the Reports of Captain Nares.*

conformity of temperature it is supposed that red coral exist.

On leaving Porto Praya, on the evening of the 9th of August, a line of soundings was taken to the south-eastward, on a course nearly parallel to the African coast, to a position in latitude 3° 8′ N., longitude 14° 49′ W., at which position the south-east trade-wind obliged the ship to stand to the westward for St. Paul's Rocks. At a distance of 95 miles from St. Jago a depth of 2300 fathoms was found; this increased to 2575 fathoms abreast the Bijouga Islands, which was the deepest water obtained on this line of soundings, 2500 fathoms being the depth at the termination, in latitude 3° N., then 130 miles from the African coast, abreast Sherboro Island. From this towards St. Paul's Rocks, there was no great change in depth, until within 300 miles of the rocks, when the water shoaled to 1850 fathoms, and then 1500 between that and the rocks, the bottom generally consisting of globegirina ooze.

The north-east trade-wind was lost in latitude 12½° N., longitude 23° W., and in the same position the Guinea current was felt, but instead of setting to the south-eastward, it was found running to the northward of east. The equatorial current was met at the termination of the south-easterly course, and continued across the Atlantic to within 400 miles of Cape St. Roque, the speed varying from half, to two and a half knots an hour.

The 'Challenger' reached St. Paul's Rocks on the 27th August, and, secured by an eight-inch hawser to the lee side of the rocks, remained until the morning of the 29th, during which time the rocks were thoroughly examined, a matter of by no means easy execution, as a current was constantly running to the west north-west the water banking up and accumulating against the weather side of the islets, rushed past each end at a rate of at least three knots an hour, causing a confused sea and an eddy tide-race under the lee, and this to such an extent that the boats were unable to pull to the windward side of the rocks.

These rocks have been frequently described: they are a cluster of islets grouped in the form of a horse-shoe, the whole extending no more than a quarter of a mile north-east and south-west. The highest is only 60 feet above the level of the sea, and is covered with a mixture of phosphatic matter produced by birds and sea-salt, forming a species of varnish. The other rocks are more or less covered in the same way.

Landing was at times difficult, for the continuous rollers produced by the south-easterly swell recurring round the points, enter the bay, producing a confused sea. A bottle was found on the large rock containing a paper, stating that Captain Pack, of the ship 'Ann Millicent,' of Liverpool, had landed there on July 19th, 1872.

The nature of these rocks is somewhat similar to the serpentine of Cornwall. They appear to be a mixture of forms of felspar and silicates of alumina and magnesia. Two species of birds only were seen—the "booby" *(Sula fusca)* and the "noddy" *(Sterna stolida)*: they were in myriads, and so tame that they could be caught by the hands. There were numerous nests of the noddy, made of seaweed; a few had eggs or young ones in them, but the breeding season was evidently past. No other animals were found save a small scorpion, a few crabs, spiders, and parasites of sea birds. Of vegetation there was none, not even a lichen could be discovered. Great quantities of fish were taken, and those enemies to sailors—sharks—were numerous.

It had been proposed to erect a lighthouse on these rocks as a memorial to the late Captain Maury, of the United States Navy, who in his lifetime had rendered such good service to the maritime world, and Captain Nares examined the site in relation to that proposal. He reports that "there is an excellent site, requiring very little preparation, on the south-west islet, 10 feet above high-water mark, consisting of a flat surface, 100 feet by 40 feet, conveniently placed. With a derrick, the immediate landing would be easy during the northern summer. Any of the present small rocky hillocks, rising from an uncertain rocky base, would require considerable work to reduce them to the necessary 20 or 30 feet before a base of sufficient size for a foundation could be obtained. If this were undertaken, an additional elevation of 20 or 30 feet would be gained, but the expense would not compare favourably with the work"; and as the rock of which the islands are composed is not fit for building, even if the expense of supporting labour at such a distance permitted it to be used, and as there is no fresh water procurable, it is not probable that the proposal will ever be carried into effect.

From St. Paul's Rocks, soundings were taken in the direction of Fernando Noronha; 2200 fathoms were obtained towards either end of the line, and 2475 fathoms midway between them.

On arriving at Fernando Noronha (which is a penal settlement of Brazil), the Commandant gave permission to Captain Nares to survey and explore the island for scientific purposes; but on the following morning, as the scientific corps were about to leave the ship, a message was received from the Commandant, withdrawing the permission he had given the previous evening. Captain Nares remonstrated with him, but to no purpose. He stated he could not take the responsibility, but said they were free to come and go and walk about the island, and would even supply horses, but would not allow a butterfly or a single plant to be collected without previous permission obtained from his superiors. As that was out of the question, and there was nothing to be gained by delay, much to the regret of the naturalists and botanists, the 'Challenger' weighed anchor and left the island, sounding to the south-west.

The ground to 19 miles from the island was very rocky; beyond that distance there was 2150 fathoms with a bottom of ooze, this proving that there is a deep water channel between Fernando Noronha and Las Rocas. The water deepened to 2275 fathoms midway between Fernando Noronha and the Brazil coast, shoaling again to 1375 fathoms near the coast. Soundings were continued parallel to the coast of Brazil towards Bahia, at which port the expedition arrived on the 14th of September.

Without stopping to sound or dredge, the 'Challenger' proceeded thence to the southward until she was off the Abrolhos Bank, when a sounding was obtained in 2150 fathoms. It was the intention of Captain Nares to have visited Trinidad, but the wind keeping to the westward, he was unable to get within 350 miles of that island, and the necessity of getting the ship into a colder climate was considered so urgent, that the idea of making for it was given up.

On the 3rd of October, in latitude 26° 15′ S., longitude 32° 56′ W., soundings were obtained in 2350 fathoms, and afterwards the trawl was let down: on heaving in, the strain was much greater than usual, and great care and patience were necessary to bring it to the surface. Great excitement prevailed, particularly in the scientific corps, who were indulging in the prospect of a rich prize, and all were speculating as to what the contents of the trawl could possibly be, and, among other conjectures, the great sea serpent or a mermaid had their share. However, the curiosity excited was not doomed to be gratified, for just as it came to the surface, and the men were hooking the *burton* to hoist it inboard, the swivel between the chain attached to the trawl and the dredge-rope parted, and the trawl, and its doubtless valuable contents, sank to the bottom, thus affording another opportunity to the philosophic mind to practise its own philosophy.

On the 6th, at a distance of 300 miles from the last sounding, another was obtained in 2275 fathoms; and on the 10th another, 400 miles from the last, of 2050, from a white clay bottom; and the next day, in 1900 fathoms, the trawl brought in a rich haul of fish, prawns, corals, star-fish, &c., much to the delight of the naturalists.

At daylight on the 14th of October Tristan da Cunha was sighted, and a sounding taken in 2020 fathoms.' Not arriving near the island until 10 at night, the ship *lay to* until the morning, and then anchored off the settlement.

Tristan da Cunha is the only inhabited island of the group, and contains eighty souls in all. Originally a corporal's guard of Artillery were stationed at the island during the captivity of Napoleon Buonaparte at St. Helena, although what service they could have rendered there, at a distance of 1300 miles, it is difficult to conceive, excepting that it was well known that all manner of mad schemes were proposed for the escape of the illustrious prisoner, and it was feared that some projector might make Tristan da Cunha his head-quarters, to mature his plans, and make the attempt. Suffice to say, that when the prisoner died and the soldiers were no longer retained, a corporal and another soldier, with their wives, volunteered to remain on the island, since which time the population has increased by births and emigration from the Cape of Good Hope. Confined to a low peninsula, backed by cliffs 1000 to 1500 feet high, and difficult to climb, the inhabitants are enabled to grow sufficient potatoes, and to find pasturage for numerous sheep and cattle, but for corn and other necessaries they are entirely dependent on passing whalers, in barter for their meat and potatoes. The eggs of the Molly Mawk *(Diemedia chlororynchus)* are a staple article of food in the breeding season.

The inhabitants look healthy, and seem contented; occasionally one leaves in a passing vessel for the Cape of Good Hope, and an old lady of seventy years of age proposed going thither in the 'Challenger'; but this was respectfully declined. The first Governor, Corporal Glass, has been dead many years, and, although there is no recognised chief, the oldest man, at present one Peter Green, is tacitly acknowledged as such, acting as spokesman and salesman on all occasions when necessary. The property of the islanders is considerable, consisting of about 600 head of cattle, and about the same number of sheep. They have a plentiful supply of poultry and pigs. As fresh provisions are always welcome on board ship, it is surprising that so few vessels call for supplies; perhaps the cause may be assigned to the islanders themselves, who, to ships that have not time to wait, drive rather hard bargains for their commodities.

The houses are neatly and well built of the soft stone of the island, dovetailed together to withstand the force of the winter gales, no mortar being used in their construction; the roofs are of thatch of long grass, topped with sods of turf.

Captain Nares was informed by the inhabitants that nearly two years before two Germans had landed on Inaccessible Island—one of the three islands of the group, about 20 miles to the south-west of Tristan da Cunha—and as no communication had taken place between the two islands for a long time, it was doubtful if they were in existence. This information induced Captain Nares to visit the island, and leaving the anchorage at 4 P.M., at 10 they stopped off Inaccessible Island. The next morning, being off the east side of the island, a hut was observed on the beach, and a boat was sent in. As she approached the two Germans were seen standing on the beach, a little to the northward of the hut, evidently hesitating as to what they should do. As all men act who for a long time have existed without intercourse with their fellow creatures, they seemed to doubt whether their visitors were disposed to be friendly, but they were seen to walk towards the boat, and gladly accepted a passage to the Cape of Good Hope. The story of their long sojourn on the island, although it reads like another of Defoe's tales, has the advantage over *Robinson Crusoe* that it is substantially true in every particular.* It seems that the younger of the two Germans, Gustav Stoltenhoff by name, had been a seaman in the ship 'Beacon Light,' in 1870, and when on a voyage from Scotland to Rangoon, the ship had caught fire when between 600 and 700 miles from Tristan da Cunha. She was steered for the island, and the fire kept under for three days, but on the evening of the third day the hatches were blown off, and, as the ship was no longer tenable, the captain and crew were obliged to take to the only remaining boat, and, with a small supply of provisions and water, started to make their way to the island, then considered 300 miles distant; but it is supposed they must have been much nearer than that, as, two days after, they made the peak of Tristan da Cunha, and being seen from the island, a boat went to their assistance, and they were taken in tow to the island, where they were kindly received by the inhabitants. Eighteen days after, they were taken off by another ship, and landed at Aden.

From Aden young Gustav made his way back to his native country and birthplace, but only to find his family ruined by the war, and his brother, who had served in it, a beggar and without occupation.

Doubtless, the few days the young sailor had spent among the friendly people at Tristan da Cunha had been most agreeable; the free and easy life, and the absence of troubles, must have impressed him strongly, the more so from having, at the time he was there,

* We are indebted to one of the officers of the 'Challenger' for the incidents of this narrative.

just escaped from very great danger by fire and water, and as the brothers had to make a new start in life, and all prospect of doing so at home being very gloomy, the younger proposed to the elder that they should make their way to the island he had such kindly recollection of and take up their abode there, away from all the turmoils of civilized life; to this the elder consented, and they worked their way to St. Helena, from which island they could obtain a passage to their destination in a whaler.

At St. Helena they expended their little stock of money on an outfit suited to their new life, and among other necessaries became the owners of an old whale-boat, the best they could get for the money at their disposal, and in November 1871, embarked with all their treasures for Tristan da Cunha in the American whaler 'Java,' Captain Mander. On the passage, the captain, from some unexplainable reason, worked so strongly on the minds of his passengers as to persuade them to land on Inaccessible Island instead of the one they were bound to. Captain Mander described the island as fertile, and having a valley that led from the beach to the summit, and that on all occasions when he had landed he had seen numbers of wild pigs and goats.

The brothers were landed on the 27th November, 1871; their stores consisted of their whale-boat, some rice, flour, biscuits, sugar, tea and coffee, some salt, a little tobacco and pepper, and a small supply of spirits and wine, some empty barrels for oil, lamp, matches, a rifle, fowling-piece, shot, powder, &c. They also had a few tools, a wheelbarrow, cooking utensils, some seed potatoes and garden seeds, a dog and pups, &c. Their library consisted of eight or ten volumes of very miscellaneous reading with which they got intimately acquainted before they left the island.

They were landed on the shingle beach on the west side of the island, from which by a ravine there was very difficult access to the summit of the cliffs. Four days after they landed, a party of sixteen men, in two boats, arrived from Tristan da Cunha. The 'Java' had been becalmed off that island, and the captain had given information of the landing of the two brothers, and as the sealing season had set in, the Tristan da Cunha men set out at once for Inaccessible Island; they behaved with much kindness to the brothers, pointed out that the position they had chosen on the north-west side of the island exposed them to prevailing winds, and advised them to shift their quarters to the north-east side, which they at once agreed to do, and the Tristan da Cunha men took all their stores round, and showed them how to build a hut, and soon after left them, promising to visit them at Christmas, and the brothers at once set to work building their house near a waterfall, clearing the ground, and planting their seed, and otherwise making preparations for a long stay. Firewood was plentiful, being only of one kind *(Phylica Arborea)*, which although always green, burns well; and by aid of the long grass they could reach the summit of the island, where there were about four miles of broken, uneven ground. The beach was about a mile long, with a strip of ground back to the foot of the cliffs.

Using the boat, they captured nineteen seals, but were unable to *render* the blubber. The month of November is the pupping season; the males land first and afterwards the females or clapmatches, and when they have given birth to their young, and the new generation are able to shift for themselves, they all leave the island. *Par parenthesis*, it may be remarked that the seal makes a very affectionate mother, as the young when first born are unable to swim; the mother may be seen with her young one in its mouth literally teaching it, and even when unable to go by itself, the mother may be seen swimming about with her one or two young resting on her back; and it is a pretty sight to see the mother land her young by taking it in her mouth paddling about until a swell raises her high enough to deposit her progeny in safety on the rock.

The first house built by the Stoltenhoffs, failed to keep out the rain, and they had to build another; but while thus working hard at their houses and plantation, they were quickly consuming their store of provisions without replenishing it, and they soon became fully aware that the time would arrive when they must be entirely dependent on home produce. They occasionally used their boat in sealing, but unfortunately she was too heavy for two men to handle, and got so damaged that they could only keep her afloat by constantly baling. This was a momentous event to the poor fellows, as in the beginning of April, 1872, the tussock grass growing on the cliff at the back of their hut, and by means of which they were enabled to get to the summit of the island, accidentally caught fire as they were clearing their ground by burning, and the only way left them of ascending was by going round to the north-west side in their boat; thus by the accident to the boat their means of existence was cut off; however, nothing daunted, they cut their whale-boat in two and built up a stern on the best half, and christened their extraordinary looking craft, the *Sea Cart*, and by means of the Sea-cart, they were enabled to get round the point and to the summit of the island, on which were pigs and goats; they found the flesh of the latter extremely good, but that of the pigs was unpalatable owing to their feeding partially on sea birds.

On the 14th of May an English ship hove in sight, and a fire was lighted to attract attention, as their boat was not safe to go outside the kelp in. The captain afterwards reported at Tristan da Cunha, that he had seen two persons on the island, also a square-sterned boat, but that no one came off, and that there appeared to be too much surf for him to attempt a landing.

The poor fellows' hearts sunk within them as they saw the ship bear away from the island, as winter was setting in on them with heavy gales and much rain, moreover in one of the gales their sea-cart was washed off the beach and wrecked, leaving them no means of getting to the accessible side excepting by swimming round a high bluff: this great loss occurred in June. In May they dug their potatoes, and in the following month some of the other vegetables were fit for food; but being unable to reach the top of the island, the store of provisions became so reduced that they were obliged so to reduce their daily allowance, that towards the middle of August they were greatly reduced in strength. Although fish could be caught in plenty at a little distance from the shore, but few could be taken from the rocks, so that the loss of their boat stopped that means of supply.

In the middle of August, the male penguins landed to prepare their nests for the season, and at the beginning

of September were followed by the females, who began laying; and, strange to say, the day before this happened the brothers had eaten their last potato, and but for the timely supply of eggs for food, would have perished.

In September, a passing French vessel communicated with them, and, in return for some penguins' eggs, they obtained about half a hundred-weight of biscuit, and were disappointed of a further supply of stores by the captain putting to sea. In October (1872), a sealing schooner, named the 'Themis,' communicated, and landed six men from Tristan da Cunha. The captain of the 'Themis' gave the brothers a small quantity of salt pork, biscuit, and tobacco. On leaving, the captain promised to return in a few weeks' time, but did not do so. At the end of October, the supply of penguins' eggs failed, and on the 10th of November the biscuits and pork were finished, and necessity obliged them to make preparation for swimming round the bluff in search of food. Their powder, matches, and other things requiring to be kept dry, were secured in a cask, which they towed round the bluff. The night was spent at the foot of the cliff, and the following day with great difficulty they succeeded in reaching the ridge, and, crossing over to the west side, descended to their first landing place. A pig was shot, and they enjoyed a hearty meal of fresh meat, the first they had partaken of for many months. In this way they lived until the 10th of December, having shot six goats. A hut was built at this time on the plateau to shelter themselves when hunting.

An American whaling schooner visited them, from which they obtained some small supplies, but they would not take that opportunity of leaving the island, expecting the return of the 'Themis.' A party of Tristan da Cunha men also landed on the west side, and captured no fewer than forty seals. During the stay of the party, they shot eight of the remaining twelve goats, and, on leaving, assured the brothers that the 'Themis' would most certainly call the next month. Although anxious to leave the island, the brothers were unwilling to go to Tristan da Cunha, feeling that they would not be welcome; and as these were the last people they saw before they were rescued by the 'Challenger,' they were therefore ten months without communication with their fellow men.

In January 1873, Frederic again swam round the bluff, mounted the cliff, and succeeded in shooting four pigs: these were thrown over the cliff to the brother below: he refrained from shooting the remaining four goats. At the end of the month Frederic rejoined his brother, and the day after he did so a party from Tristan da Cunha landed on the west side, and either shot or caught the remaining four goats, which they took away with them. They did not communicate with the Germans, and as this was intentional, the brothers considered that their object was to drive them from the island. Probably the Tristan da Cunha people considered that their residing on the island interfered with their hunting-ground; at all events, after their kindness to them on arriving on the island, their conduct was at least inexplicable.

In February, potatoes and other vegetables, mixed with pigs' fat, formed their daily food, but in March, that food being exhausted, another visit was paid to the plateau, and the goats were then missed, which they had abstained from shooting, but they shot several pigs. At this time, their one great comfort, tobacco, failed, and this to a German is more than we English should feel; they tried to replace it by dried leaves, but without success.

The dogs which they had brought on shore broke loose, and played sad havoc among the penguins, killing great numbers, and as one was apparently mad, the three were shot. It was now decided that the brothers should separate for a time, the elder to remain on the plateau to provide food, whilst the younger remained below to melt down and store the fat, and attend to the clearing; the want of salt prevented curing the flesh. Three young pigs had been caught and got down the cliffs without injury, then secured to a cask and towed round the point, but were nearly drowned on their passage; they were placed in a sty, and fed with grass and what could be spared from the garden, and also with penguins' eggs, when procurable.

At the end of April, the elder rejoined the younger, and in the attempt to convey two more pigs round the bluff, was nearly drowned; the pigs were so. In June, Frederic again went to the plateau, and remained there until the 18th of August; the brothers were not altogether without communication during that time, for excepting when the noise of the wind or surf prevented, they could hold a kind of conversation. In June, July, and August, they lived on pigs' flesh only; the penguins then began to lay, and in their eggs they had abundance of food until the 16th of October, when the arrival of the 'Challenger' terminated their exiled existence.

Having embarked the two Germans and their little belongings, the 'Challenger' proceeded to the third island of the group, Nightingale Island, about 12 miles distant. Unlike Inaccessible Island, the peak, which rises from the centre of the island to 1100 feet, is accessible by an easy and gradual rise on all sides. The tussock grass is 6 or 8 feet high. From the sea the island appears to be covered with turf, and made the voyagers long for a run over it, but on landing their hopes were quickly dispersed, for the apparent turf proved to be nothing more than the long tussock grass above mentioned. At the foot of the tussock grass were innumerable penguins breeding, which were not seen by the explorers until they were fairly amongst them; thinking to avoid them they pushed through the long grass, but as they proceeded the penguins were so thick, sitting on their nests, that it was impossible to avoid treading on them, or otherwise disturbing them. This the penguins resented by attacking the invaders on all sides, picking at their legs most unmercifully, and their beaks being sharp and strong, it required good boots to protect their legs from their repeated assaults, whilst the noise—which is described as between that of a pig being killed, and a kid that had lost its dam—was deafening. The progress was slow, as at every few yards they had to stop to kick the birds. It was impossible to estimate the number of birds, as, looking down from the summit of one of the out-lying islets, every square foot of ground seemed to have its penguin. There must have been millions of them. In the evening all returned to the ship thoroughly disgusted with their day's experience of penguin life.

The next day (18th October) soundings in 1000 fathoms were obtained between Nightingale Island and

Tristan da Cunha; the dredge did not reveal any new form of animal life.

Between Tristan da Cunha and the Cape of Good Hope the weather prevented sounding so frequently as was wished: the four obtained on the 20th, 23rd, 25th and 27th, proved the existence of a deeper channel on that side of the South Atlantic than was found on the west side. The 'Challenger' arrived at the Cape of Good Hope in the afternoon of the 28th October, but the authorities placed the ship in quarantine, whilst they debated as to the propriety of granting pratique, from the fact of there having been a case of yellow fever on board thirty-five days before!

The results of the explorations of H.M.S. 'Challenger,' in the North and South Atlantic, may be considered as twofold, viz., that relating to natural geography in the form and contour of the ocean bed, and that pertaining to physical geography as developed by the serial and bottom temperatures, which will be more or less influenced by the observations on specific gravity and the analyses of the water from the various depths; but it is not too much to advance, that the effect of their consideration will not be sufficient materially to alter the deductions drawn from the isotherms as observed, as every dependence can be placed on the record of the protected thermometers.

J. E. DAVIS.

SIGN-POSTS ON OCEAN'S HIGHWAY.

II.

BASALT.

"The stony rocks are not primeval, but the daughters of time."—*Linnæus.*

"A man without a mental picture is unfit to be a philosopher."—*Tyndall.*

WE passed many years of our life amongst the basaltic regions of India; broken sided, blocky-topped highlands, with great tors sticking up in one place, and tall spire-like columns in another. As we roused the spotted leopard from the cactus thickets on the hill side, as we followed the wild boar over the hill tops, strewed with basaltic blocks from the size of a hat to the size of a house, we could not avoid seeing that the fragments round us were the remains of higher places; vast mounds, heaped up in utter confusion, told of broken tors, long lines of shattered rocks told where lofty spires had fallen. Some fragments were angular, telling of late fractures; some were worn on the edges, telling of long exposure to the atmosphere; some were worn by longer time into three-sided boulders, resting on a still angular base, evidences of an unmoved condition for thousands of years. There were cracks on the surface rock, fresh and sharp, others with well-worn edges; the whole scene pointing to a long continued, never ceasing, breaking up of the basalt surface rock under the never resting forces of ordinary denudation; these were a hot sun, heavy rains, the growth of vegetation, acid percolations, and old time.

Buddhists and Brahmins have been busy with these rocks for more than two thousand years; vast cave temples have been hewn out of their hearts by mallet and chisel; great shrines, full inside and out with strange figures, man's ideal gods and demons, satisfying for long years the human instincts of hope and fear, are carved there from the black basalt, the outward and visible sign leading the inner hearts of some to their unseen Bugwan, our God.

However antiquated some of these oriental customs may be, we cannot help respecting so long, so devoted a love; we cannot help seeing that it is the result of an early practical lesson inculcating a duty beyond which the simple wants of nations have never gone; the simplicity and the sameness run through the people. The man who gathers stones on the mountain brow now, the sculptor of idols now, and the priest who officiates at the shrine now, are the adopted or lineal descendants of those who did the same things thousands of years ago; each man uses the same pattern of utensils, the same kind of water-pots as were used in their beginning.

These men are full of their trade traditions. We asked them how these basaltic rocks were made: the ordinary reply was, "by the Bugwan." A spare, dull-eyed ascetic, in a small temple at a hot spring near Arawud, in the Syadra range of mountains, a solitary human being amongst the wild beasts of the jungle, replied to our persistent inquiries in oracular language, "Why do you ask? They are from God!—there is nothing new: the air, the rain, and the sunshine have formed these rocks. The surface of to-day is formed of what is, the surface of yesterday was formed of what was. The winds and waters convey to burial to-day; they did the same yesterday. There was purity in the beginning there is impurity now; they have mixed, but they rise again: do you not see the sunshine, the rain, and the air? Be satisfied!"

"And this hot spring"? I asked.

"I have just told you!—understand! You eat and drink the sunshine, your blood is warm; the fish eats and drinks in the slow absorbing water, its blood is cold. The fish and you are of the earth, do you not return to it? Is she not a universal mother? This spring is warm, that river is cold, nothing is forgotten!" The old man stepped into his bubbling cistern, creeping close to his venerated cow's mouth, sculptured in basalt, to warm his shrivelled limbs in the offspring of the sunshine and the rain. We recorded his concentrated thought.

Wandering by the banks of Indian rivers, tempting the fish with the yellow fly, or stopping to examine the basaltic boulders strewed around, thick as apples on the orchard grass after a September storm, the old question arose, Where did the basalt come from?

These water-worn boulders were very hard, but they were scratched or striated, and scooped out into great caldrons by the friction of sand and gravel washing round and round by water forces in their surface hollows. In quiet corners and on river beaches we found collections of fine black lustrous sand, remnants of the triturated boulders or of the basaltic river bed: these sand heaps were collected and carried off to the city of Bhoranpoor for the manufacture of glass bangles. This finely comminuted and well-washed sand could be carried 20 miles, and converted into glass at less expense and less waste than the unbroken, unwashed, impure basaltic rock found on the spot.

We now knew that basalt was of the earth, the air, the water, and the sunshine. It could not have been without the three latter; it contained earthy matter that could be washed out by the water, or burnt out by the fire.

We thought of those early days when the first grasses grew on the first dry lands, when the spirit of God brooding on the waters stirred up their lowest depths, not so deep then as now, forming from its pure silicious foundations a brighter mud than is formed to-day, and mixing these materials with the impurities of the first growths. We had read a dark link in nature's chain stretching in one unbroken line from the present, through the past, into the sunshine of the early earth.

> "From nature's chain whatever link we strike,
> Tenth or ten thousandth, breaks the chain alike."

No link was missing, the pure silicious matter of the Azoic had mingled with the impure burials of the Palæozoic epoch; materials so digested, so illegible, that the link could only be read by the context. These materials could be again eliminated from the purer matter by water or by fire. By the latter the silicious material could be converted into glass or lava, its earthy materials into ashes, and its water into vapour.* By the former, the earth and water could be converted into mud, and the silicious material could be left as sand. It is allowed that basaltic formations were once in plastic conditions. If some of the constituents are lost sight of under the action of fire, we cannot allow that the plasticity was derived from a fused condition; but as the constituents are not lost sight of by the water process, we may assume that the plastic condition of the basaltic formations was as mud. We had the evidence of our own poor body to show the wondrous alteration made by the chemical laws of nature in what we eat and drink; we know that the earth beneath our feet was composed, possibly of some ashes, certainly all of its own dust, multiplied and changed many times over by vegetation and life. We imagined that the contributions from the vegetable and animal kingdoms were not always so plentiful or varied as at present, and we gave nature the credit of carrying on God's "rule of law," in the dust returned to her, as it was carried on in the dust lent to organisms, for their moments, their days, their years,

* We have several times alluded to the fact that basalt, as we find it, contains in its constitution several substances that are lost to its products in a molten condition. The accompanying Table* may be referred to on each occasion. The first column shows a late analysis of a certain basaltic rock; the second shows the contents of portions of that rock. We do not mean to assert by this Table that glass, slag, or lava, is formed from the rocks of the three first columns, but their analogies have been noticed before, and now we use them to exhibit discrepancies. These tend to prove that basaltic rocks, as we find them, could not have had their origin in fire. It is strange to read the arguments of learned men regarding the supposed recovery of lost substances by the basaltic rock after its imaginary molten birth. As they never could have been in a molten condition, these arguments may now cease, and we shall not again see a sentence like the following, that was once penned for our own instruction:—"Basalts like those of the Giant's Causeway cannot be distinguished from those of unquestionable volcanic action."—*Forbes' Athenæum*, No. 2155. We ask, Where are they?

TABLE OF THE CONSTITUENTS OF BASALTIC ROCKS; SHOWING WHAT CONSTITUENTS THEY LOSE BY BEING MELTED.

Minerals in Rossberg Basalt. — Dr. Petersen, —*Geo. Mag.*, No. 117.	Analysis of Hydro-tachylyte and Tachylyte.	Rowley Rag Basalt. — *Athenæum*, No. 2153.	Glass. — Kane.	Plate Glass. — Dumas — *Athenæum*, No. 2155.	Blast Furnace Slag. — *Athenæum*, No. 2155.	Lava. — Silvester — *Athenæum*, No. 2153.	Lava. — *Athenæum*, No. 2155.	Absent from original rock before melting, or lost in that process.	REMARKS.
Augite ...	Silica	Silica	Silicic acid	Silica	Silica	Silica	Silica.		
Olivine ...	Lime	Lime	Lime	Lime	Lime	Lime	Lime	Olivine ...	This is a product of leaves and bark of trees, from Salicine.—*Kane.*
Nepheline	Alumina	Alumina	Alumina	Alumina	Alumina	Alumina	Alumina	Nepheline	
Titaniferous Magnetite	Magnesia	Magnesia	Magnesia	...	Magnesia	Magnesia	Magnesia	Titaniferous Magnetite	
Apatite ...	Ferric Oxide	Protoxide of Iron	...	...	...	Protoxide of Iron	...	Apatite ...	A phosphate of lime, or an earthy material of bones. —*Kane* and *Page.*
								Ferric Oxide	
A Plagioclastic Felspar	Ferrous Oxide	Sesquioxide of iron	Oxide of Iron	...	Oxide of Iron	...	...	Ferrous Oxide	
Leucite ...	Potash ...	Potash ...	Potash			Potash		Sesquioxide of iron	
Mica	Soda	Soda	Soda			Soda	Alkalis ...	Felspar Leucite	Partly convertible into the silica or lime.
Melitite ...	Water ...	Water ...	...			† Water		Mica Melitite	
Hauyne or Nosean	Phosphoric Acid	Phosphoric Acid	...	Alkalis ...	Alkalis ...			Phosphoric Acid	The vegetable or animal constituents of rocks, when melted, would vanish in vapour, or resolve into ashes; while the metallic would naturally sink below the lighter lava and be lost, to the product of melting.
*Osteolite	Titanic Acid	Titanic Acid	...					Titanic Acid	
*Zeolitic Minerals	Manganous oxide	...	Oxide of Manganese					Manganous oxide	
...	Chlorine	...	Oxide of Lead	...	Other bases	...	Oxide of Iron	Hauyne or Nosean	
...	Fluorine	...	...	...	...	...	...	‡ Osteolite ‡ Zeolitic Minerals	Osteolite is from phosphorous existing in all animals and in a few vegetables.

* Products of decomposition. † It is quite possible that this water was absorbed by the lava after ejection. ‡ Products of decomposition.

As no two basalts could give the same analysis, so no two molten products could be similar. This Table shows that the formation of basalt is not due only to the Azoic epoch.—*H. P. Malet.*

and their centuries. As we read the changes in our own body by the context, we used that for reading the rock. We saw a grand sign-post on ocean's highway pointing with a sure finger to silicious and earthy mixtures, once held in solution, settling down as mud, and forming into the basaltic rock.

However easy it was to come to this conclusion, in the self-confidence of youth, with all nature fresh, fair, and unsophisticated before us, we are puzzled in our old age by the many sign-posts erected at every turning, all pointing to new paths for the same goal; set up, painted, and inscribed by men as confident in their local knowledge as we once were; each one pointing to the only direct road for the formation of basaltic mass and mountain height. The directions are clear and explicit, but all differ; they cannot all be right; there must be something mental and philosophic somewhere. We propose to walk into a few of these paths, with the hope of finding out the true origin of basalt. We look at the fair pictures by old Italian masters, we see a hundred St. Sebastians, we count thirty-seven holy families in one gallery; they are all ideal; none of the painters saw the holy family, or the saint: they were all philosophers. We lately remarked to a noted sculptor, that he must have had a charming model for a statue. "We improve on our models," was his reply. Are all the finger posts before us improvements on nature's direction? are they mental pictures of basaltic origin and igneous causes?

The chameleon occurs to us here :—

> "When next you talk of what you view,
> Think others see as well as you."

So, without replying to that question, we place a few pictures before our readers, promising an acceptance of their decision if they can prove that any one is right. The galleries before us are very extensive, the pictures and the sign-posts very elaborate, very interesting. We cannot remark on all, we cannot do full justice to any, we only propose to notice a few pictures, which have reference to our subject.

About the time that we were observing basalt in India, 1831 to 1839, Charles Darwin was sailing round the world in the 'Beagle,' preparing his *Naturalist's Voyage*, his picture of molten rock mountain formation comes first on the list—

(No. 1.) "I believe that the solid axis of the mountain differs in its manner of formation from a volcanic hill only in the molten stone having been repeatedly injected, instead of having been repeatedly ejected."—*Darwin.*

The frequent injections were suggested by a desire to keep the earth in order, for the next picture shows—

(No. 2.) "If the strata had been thrown into their present highly inclined, vertical, and even inverted positions by a single blow, the very bowels of the earth would have gushed out."—*Ibid.*

We can only remark in passing, that if molten stone can be kept in conical, peaked, or in chain-like form, the gushing bowels might have assumed the same shapes; our mountains might have been larger than they are; we might have been freed from all anxiety as to more molten matter, but the precession of the equinoxes might have brought us into trouble. The next sketch shows that—

(No. 3.) "The Himalayas disturbed and bore up with them, in their upheaval, vast beds of the oolitic system. Belemnites and ammonites have been dug out of their sides along the line of perpetual snow, 17,000 feet above the level of the sea."—*Hugh Miller.*

This upheaval of a million of square miles by an unknown force did not seem so dangerous to Miller as the injection did to Darwin. We shall have something to say on its probability presently. We now enter a small, rich, introductory cabinet of geological subjects by Mr. Page, where we find that—

(No. 4.) "Basalt is of igneous origin, essentially composed of augite and felspar, with admixtures of hypersthene, hornblende, &c."—*Page.*

Mr. Page does not tell us how the constituents united, or how perishable and convertible materials endured the igneous origin. As his book is much used in schools, it might be as well to add a footnote in the next edition, for the benefit of this inquiring generation.

We now step into a series of rooms called the *Geological Magazine;* in No. 114 we are introduced to mountains—

(No. 5.) "Forms of beauty, grace, and grandeur, which impress themselves in varying degrees of intensity upon our senses."—*H. Woodward.*

This is a frontispiece to a very beautiful portfolio, which we shall have occasion to return to occasionally; at present, we select from its pages certain sketches—

(No. 6.) "Deposits, 40,000 feet in thickness."—*J. Hall.*

All of which can be elevated by

(No. 7.) "The theory of aqueo-igneous fusion of deeply buried sediments."—*Le Comte.*

If the heat is created by the buried matter there would be some truth in this picture, but this truth is disguised by the next—

(No. 8.) "At the depth of 40,000 feet, at an increase of 'about 90° per mile,' a temperature of 'nearly 800° Fahr.' would be found sufficient 'to produce aqueo-igneous fusion.'"—*H. Woodward.*

A certain depth for heat, and a certain heat for melting rocks have been long desired data, but we are thrown into confusion again by the next sketch—

(No. 9.) "A small quantity of alkali in the included water of such sediments would melt rock at lower temperatures."—*Ibid.*

There is much truth in this, but the measure of depth is utterly lost, because alkali may be on or close to the surface. This sketch (No. 9) will be looked at again, but we walk on to another—

(No. 10.) "It is 'by no means impossible that in some cases the granite may be squeezed out as a pasty mass through a rupture at the top of the swelling mass of strata.'"—*Le Comte.*

We do not recognise any necessity for the strata to swell, but there is no doubt that granite, as cold mud, has been squeezed out of its original position. We shall come to the explanation of the phenomenon by-and-bye. We now come to—

(No. 11.) "Such trivial modifications of elevation or depression as we see are, after all, only skin-deep; they are but wrinkles left by the hand of time on the still fair face of mother earth."—*H. Woodward.*

This is natural, and pretty; wrinkles are left by the sinking of soft, and the apparent elevation of harder matter; but as if we were hunting an igno-fatuus,

instead of an aqueo-igneous, Mr. Woodward warns us not to accept an idea, that has been "ably advocated" in England and America in pictures,

(No. 14.) "Of a slowly progressive subsidence over areas of accumulation occasioned by the weight of the slowly and successively accumulated sediments."—*Dana, Silliman, Ricketts.*

If this subsiding had been true, then

(No. 15.) "'The solid mass of the Himalayas,' occupying some million of square miles, must have sunk into the 'yielding crust beneath.'"—*H. Woodward.*

It would have been unfortunate if these grand wrinkles had vanished from our mother's brow, but we all know that there are soft and hard foundations. The Himalayas have the latter, but in volcanic regions, where there are several actions at work to undermine the strata, the mountains do subside, as they have done in the Andes and other places. Under a universal law it seems that old people and old worlds must have wrinkles; they seem to come quicker in both cases, where the fiercest fires burn, but quickest of all where fire and water combine to ruin the foundation—

(No. 16.) "Passing on to *Geological Magazine*, No. 109, we find a picture of blocky rock surfaces formed by erupted volcanic masses, as 'the basaltic hills of the Siebengerbirg,' by shrinkage during consolidation, from a more or less pasty magma,' after 'a state of igno-aqueous liquefaction.'"—*Poulett Scrope.*

There is a great deal of nature in this picture, the *igno* being the only unnatural touch in it as the entire scene could be exhibited as an aqueous liquefaction. There is a difference of treatment of the same subject between M. Poulett Scrope, and Capt. F. W. Hutton. In *Geological Magazine*, No. 115, we find the latter defending his sketch—

(No. 17.) "The 'deposition theory' of mountain formation, or the removal of matter from one place to another by lateral pressure."—*F. W. Hutton.*

We must come to this squeezing process hereafter, but there are etchings before us that we must look at. In *Geo. Mag.*, No. 116, the Rev. O. Fisher exhibits

(No. 18.) "'Damped paper stretched on a board,' as an excellent illustration of mountains."

Perhaps there is more truth in this than we can at present explain, but the artist gives us another illustration—

(No. 19.) "So long as the tracts of the earth's surface, which we compare to brick coping, are not too large in comparison to their thickness, and of sufficient homogeneity and rigidity to be fairly represented by a course of bricks laid edgeways."

This gentleman says, "I should much like to see a diagram showing a range of mountains formed on Capt. Hutton's theory." So should we; but, by the diagram furnished by himself, we do not understand how it is that our engineers have never yet hit off one of the tunnels that nature has left through the mountains, if the bricks on edge are correct likenesses of their formation. Mr. Fisher raises his mountains by pressure, in No. 115. Capt. Hutton says

(No. 20.) "Those areas should never rise at all."

We really think that mountains may be as liable to rise on Mr. Fisher's system as they are to be pushed aside by the system of Capt. Hutton. These various theories all contain some truth in them, which we hope to elucidate presently.

Keeping some of Mr. Woodward's rooms for our return, we now step into the Treasury called *Principles of Geology*, by Sir Charles Lyell, 2nd edition, 1872. The first picture is

(No. 21.) "The basalts of Hesse are of igneous origin."—*Raspe*, vol. 1, p. 70.

(No. 22.) "The trap rock in the Vincentin analagous to volcanic products, and distinctly referable to ancient submarine eruptions."—*Arduino.*

Desmarest, Fortis, and others had

(No. 23.) "Established the relations of basaltic currents to lavas."

(No. 24.) Showed how "streams of basalt had poured out from craters, which still remain in a perfect state."—*Faujas.*

With so many verdicts in favour of fire, we do not wonder that the origin of basalt is assigned to fire. There are relations between basaltic currents and lavas. We know that lavas may be produced from, and consequently must be related to basalt: basalt therefore existed before its lava. As a thing of itself, its origin from fire is by no means proved, and it is curious that none of these artists perceived that mud torrents could be ejected from volcanos as easy as water, and that these muds when dry should be basalt. Looking to the opposite side of the room, we find a picture—

(No. 25.) "The Basalts of Hesse, and all other rocks of the same family in other countries are merely chemical precipitates from water."—*Werner.*

We are now in the arena, where Pluto and Vulcan became so celebrated a few years ago, till the latter claimed a victory. However, here is another noted picture—

(No. 26.) "In the primeval ages of the world there were no volcanos."—*Ibid.*

Sir Charles Lyell gives these pictures a place in his gallery, but condemns Werner for overturning a true theory, pointing out in a lively sketch, that—

(No. 27.) "The substitute was one of the most unphilosophical that can well be imagined."

There is more irritation in these words, than the occasion justified; perhaps it did not strike Sir Charles that true pictures cannot be so philosophical as mental ones. We now open a portfolio by a very noted artist, the frontispiece is—

(No. 28.) "The ruins of an older world."—*Hutton.*

followed by

(No. 29.) "Basalt and many other trap rocks were of igneous origin."

Their different aspect from that of ordinary lava was

(No. 30.) "Attributed to their having cooled down under the sea."

To which is appended an experimental design showing

(No. 31.) "The crystalline arrangement and texture assumed by melted matter cooled under high pressure."—*Sir James Hall.*

On which we remark, that no experiment by man is a proof of what nature can do, the result showing only that silex was present in the mass experimented on. The Professor did not feel quite satisfied himself as to some points of his igneous theory, so he wan-

dered to the Grampian Hills to seek for evidence in its favour. He soon found all he wanted, so he sketched

(No. 32.) "Veins of red granite branching out from the principal mass, and traversing the black micacious schist and primary limestone."—*Hutton.*

(No. 33.) The alteration of the limestone in contact was very analogous to that produced by trap veins or calcareous strata."—*Ibid.*

He called these

(No. 34.) "The most clear and unequivocal proofs in support of his views."—*Ibid.*

"And," says Sir Charles, "this verification of his theory filled him with delight." The Professor was unable to fit his fire theory into the formation of the primary schists, so he painted them as—

(No. 35.) "Sedimentary rocks altered by heat, and originated in some other form from the waste of previously existing worlds."

We have nothing more philosophic before us than this portfolio. The old worlds, the granite veins, the alteration of calcareous rock by a supposed igneous action, are all mental pictures; cold silicious percolations may make the alterations; veins of heavy muds may run into softer. Hutton's discoveries may have been made in the same way. His fire is imaginary; and we have no occasion to seek in previously existing worlds an explanation of the phenomena, we are incapable of comprehending in this. We are not geologist enough to be fettered by Hutton's dogma, and say that "we are in no way concerned about questions as to the origin of things." We do not wish to be antagonistic or a friend to either theory, but we do wish to discover the truth; and while we try to avoid the caution of the present school, which prevents their acceptation of things before their eyes, we will endeavour to steer clear of that rashness which has led so many geologists into the

(No. 36.) "Internal deep-seated source of heat, with which we are but little acquainted."—*Page.*

as well as into "speculations as to the interior of the globe, concerning which we can know nothing by actual observation."

Stepping back through some side rooms, where the curtains are partly drawn, we find in *The Interior of the Earth*, published in 1870, a copy of a picture by Durocher, and some originals—

(No. 37.) "Whatever be the reason, it is certain that the basic rocks, whose eruption took place during primary geological periods, were formed merely by accident, as compared with the immense development of the silicious and felspathic masses."

This geologist perceived that the silicious rocks, of which basalt is one, were not erupted rocks, so we look at some originals.

(No. 38.) Neither granite or basalt in their original state were formed by fire."—*H. P. Malet.*

The next picture explains the subject more fully, and opens up a wide field of suggestions—

(No. 39.) "What has fire done upon earth? Fire has only destroyed and reconstructed. Nothing has found an origin in fire. Fire itself is an effect, and not a cause; it is in the atmosphere, it is in the flint of the earth, it is in the water—in each it is a thing by itself, unseen or unfelt; certain conditions bring it into active existence."—*H. P. Malet.*

Passing on, we come to the latest pictures on the subject by the most accurate, and most careful calculator of the time, though some of his studies from nature seem to us to be wanting in truth; the views we look at are drawn to meet certain objections, made by Mr. Poulett Scrope, to the grand design of volcanic energy by Mr. Robert Mallet.

(No. 40.) "If I have appeared to underrate the views of geologists as to the nature and origin of volcanic heat, it is because I believe them to be wholly untenable by the light of existing science."—*R. Mallet, Geological Magazine*, No. 117.

The views alluded to are the seas and lakes of molten lava kept in the earth's interior. We have seen, in picture No. 9, how Mr. H. Woodward left an escape for himself out of the fire world, and now he hopes to get Mr. Poulett Scrope out of the burning by noting on the sketch of R. Mallet, that Mr. Scrope has doubted the internal fluidity of the earth, and the access of water to that molten matter for some years past. We do not doubt but that Mr. Scrope is as anxious to get out of hot water as Mr. Woodward is; but we refer both of them to the picture No. 16, while we find that Mr. R. Mallet, in *Geological Magazine*, No. 118, tells the Editor that his footnote does not seem "justified by facts." This molten interior on which so much depends, and on which most of the pictures selected by us are founded, seems to be a much more dangerous plaything than has been generally imagined. Here is its picture—

(No 41.) "The flood of heat poured forth from such an incandescent nucleus through such a thin skin. . . . would be such as to roast every organized being off the present face of our earth. Yet this gigantic incandescent nucleus and parenchymatous surface-skin Mr. Scrope and the school to which he belongs, must have, or their theories are impossible."—*R. Mallet.*

Mr. R. Mallet has very considerately supposed that we are 200 or 300 miles from the heated centre. We hope he is nearer the truth than picture No. 8 leads us to imagine.

We gladly step into the cool garden to think over these varied pictures of the same originals. Volcanic energy, molten mountains, melted basalt, mud basalts, other worlds, and sedimentary schists, flit before us in intangible conditions, like mock moons, or dancing reflections of the hazy sun. We cannot for a moment allow that any mass of rock, holding in its composition materials that are convertible by heat into other conditions, could have originated by fire.* By denying this origin to basalt, the question of its origin expands itself. If basalt and the old silicious schists are water sediments, No. 35, or precipitates, No. 25, how were the solutions formed that left these deposits? We cannot draw lines too fine, a microscopical line of to-day may grow large by to-morrow. Nature is composed of fine distinctions, shown nowhere more clearly than in the perpetual changes in the character of her volcanic ejections.

Lava is formed from the indestructible base of the rocks that furnish it. Lava is of varied qualities, consequently the rocks that give it must be formed of

* See note, p. 189.

varied materials. Looking back on the cosmical supplies of matter, we come to a time when they were not so plentiful or so varied as they now are. The area of land was not so extensive; the waters were more extensive, but not so deep; all the productions of either element were liable to greater trituration, and more complete defacement than at present; the winds were more unbridled, the waters were more uncurbed, organisms were fewer, therefore fewer were preserved in recognisable conditions. As the greater part of present growths return to undistinguishable dust, so they must have done at all times; as these dusts are now left alone, or carried away, arranged, and buried by wind and water, so were the dusts of old. Under the unavoidable law of nature, we thus fall in with the origin of Hutton's sedimentary schists, and Werner's precipitates from water, as ordinary formations from the dusts and muds of primary matter, mixing with the dusts and muds from the early growths of this world, all of the materials in unrecognizable conditions, all altered from what they were, all beautifully preserved in a magnificent mausoleum, but all liable to be again converted into muds and dusts, for new constructions by water; or, if acted on by fire, to separate and fall to pieces, converted, in their perishable atoms, into vapour and ashes, while the unperishable silicious atoms may melt into the analogies of glass, lava, or slag.*

We were once rebuked by a nameless critic for venturing to place before the world certain geological facts without quoting authorities. The critic was right: our word was of no value; our eyes had been of no use; no one would believe anything new of geology. We are endeavouring to avoid this impertinence now by quoting from all current authorities, and making natural deductions from their texts. We shall break no law of nature in so doing; but it is very likely that the nameless critic may be ignorant of the law, and still find occasion to dispute our truths. We will not quarrel with him if he does; but we say here that the most searching inquiry is what we most desire, feeling certain that if we have not declared the whole truth, we have declared nothing but the truth, and opened a door for others to find the whole.

While thus dreaming on, we reach an open, dome-covered building; its ceiling was beautifully painted: mountain and valley, rivers and lakes, wide plains, and a wider sea filled the roof; there was no horizon; water, earth, and their vapours mingled with the haze of heaven till it cleared off into the blue vault of the zenith. The interminable space was to us a type of the immeasurable past. Men have tried to fathom that without success; we do not attempt it, but we find on a basaltic slab an exquisite leaf of *Owen's Palæontology*, leading us to an authentic knowledge of ancient life, and showing

"That from the inconceivably remote period of the deposition of the Cambrian rocks, the earth has been vivified by the sun's light and heat, has been fertilised by refreshing showers, and washed by tidal waves; that the ocean was not only moved in orderly oscillations, regulated, as now, by the sun and moon, but was rippled and agitated by winds and storms; that the atmosphere, besides these movements, was healthily influenced by clouds and vapours, rising, condensing, and falling in ceaseless circulation. With such conditions of life palæontology demonstrates that life has been enjoyed during the same countless thousands of years; and that with life, from the beginning, there has been death."—*Owen*.

We are told by Page that the Laurentian, and Cambrian systems are "the lowest fossiliferous formations yet discovered in the crust of the earth." No one supposes that amidst these remains we have discovered fossils of the first creations. Life came by slow degrees, it increased, and multiplied; the first-born are recorded as dust, mixed up in the illegible rocks of these systems; while in and below them must be the equally undistinguishable remains of the vegetations prepared for the maintenance of the first lives. As the dusts of these vegetations must have been as liable to ignite, to expand, to give out their vapours, to leave their ashes, and to separate from their silicious masses, as the dusts are now, how is it, that though reposing on the very confines of the supposed flaming interior, their silicious portions were not converted into lava, or into the supposed igneous rocks—basalt, trap, and all their varieties?

Leaving this question unanswered, we will briefly follow Mr. Page through the systems of this earth, as arranged by him, and accepted by our schools, with the intention of finding out where certain igneous action is proved by the results.

Systems by Page.

Metamorphic.—The lowest stratified system of the Azoic or lifeless epoch is called the metamorphic; in it are "gneissic, and granitoid schists"—composed of "felspar, quartz, mica, talc, hornblende, and chlorite—these ingredients having been originally deposited as silts, and muds and sands."

Laurentian contains crystalline schists, quartzites, and serpentinous limestones.

Cambrian contains semi-crystalline slates and schists.

Silurian contains shales and limestones, grits and flags.

Old Red Sandstone.—Yellow, and red sandstones, and conglomerates. In these two systems supposed igneous rocks appear as "overspreading or molten lava," or as "scoriæ and ashes," also as "upheaving or disrupting masses, cut through by dykes of greenstone, felspar, and porphyry, seemingly indicating a cessation of volcanic action, during the main deposition of the old red sandstone, but a period of great activity and disturbance, both at its commencement and its close."

Carboniferous shows "ample evidence of igneous activity," traps and basalts are plentiful, "upheavals and convulsions" numerous.

Permian has "dykes and outbursts of basalt, which seem to be connected with igneous centres situated in the older systems."

Triassic exhibits similar conditions.

Oolitic shows gentle "outbursts of trap" and dykes of greenstone.

Cretaceous has no igneous rocks in England; but the basaltic traps of the Giant's Causeway in Ireland are supposed proofs of igneous action there.

Tertiary.—All the igneous rocks of this system are of "true volcanic origin . . . . with the exception of a few doubtful cases."

Post Tertiary, including the present, gives us plenty of volcanic action producing lava, as the melted matter issuing from granitic or basaltic rocks. Neither

* See note, p. 189.

of these rocks are now reproduced by igneous action in their normal condition.

According to these arrangements of science, we have evidence of igneous action in the two upper systems, down to the Silurian, but none in the systems below that. On this *prima facie* evidence, we answer that the silicious masses at the bottom of the stratified systems were not converted into lava, because there was no fire below them. As this answer coincides with the laws of nature, we leave it for a moment to consider another point connected with the basaltic rocks as we generally find them. Mr. David Forbes told us in the *Athenæum* of 13th February, 1869, that one lava is strikingly analagous to the old granites in chemical composition, and the other "nearly, if not quite, identical with the basalts." Also that portions of a mass of Rowley Rag Stone that he melted, when cooled, "could not, even upon minute inspection, be distinguished from the original basaltic rock." We take these facts as direct evidence that basalt existed as a rock before the experiment or the analysis were made. We allow that nature can do what man does, but the conditions must be identical in both cases. To enable nature to turn a basaltic rock into a molten mass, and back again without alteration in its features, we must find the rock in strata without gas or water; the expansion of one, or the explosion of the other would necessarily destroy the identity of the experiment and its result. This condition could not be found.

We were told in No. 8 that 800° Fahrenheit might produce fusion of rocks, but *Kane's Chemistry* (p. 56) tells us that 1000 volumes of air expand to 23,125 at a heat of 660° Fahrenheit! We can say little about water at present. Kane tells us that according to the supposed progressive increase of heat, as we descend in the earth, water could not exist as a liquid at a depth of 2 miles (p. 105). Under no circumstances could Mr. Forbes, or those who have conducted similar experiments before him, place nature in a condition similar to themselves; the expansion of the buried and imprisoned gases would have converted rock and experimentalist into some other materials. One point is, however, gained by their labours. As the basaltic rock existed before it was melted, so it must exist before any basaltic lava is produced. The molten produce of any silicious material must be analogous to our varied glass, to the slag of our furnaces, to the vitreous productions of our kilns, to the glassy streams which ran from the decomposed granite pillars during the late fire at Boston, as told by an eye witness, and to the glass bangles produced from the basaltic sand at Bhoranpoor. These products lose some of the impurities of the material from which they issue; none of these impurities could be restored by fire; the rocks could not be reconverted into their normal condition under any action of natural combustion. So that there is *prima facie* evidence to show that the basalt rock, as we find it, full of its native impurities, never was in a fused condition.

H. P. MALET.

(To be continued.)

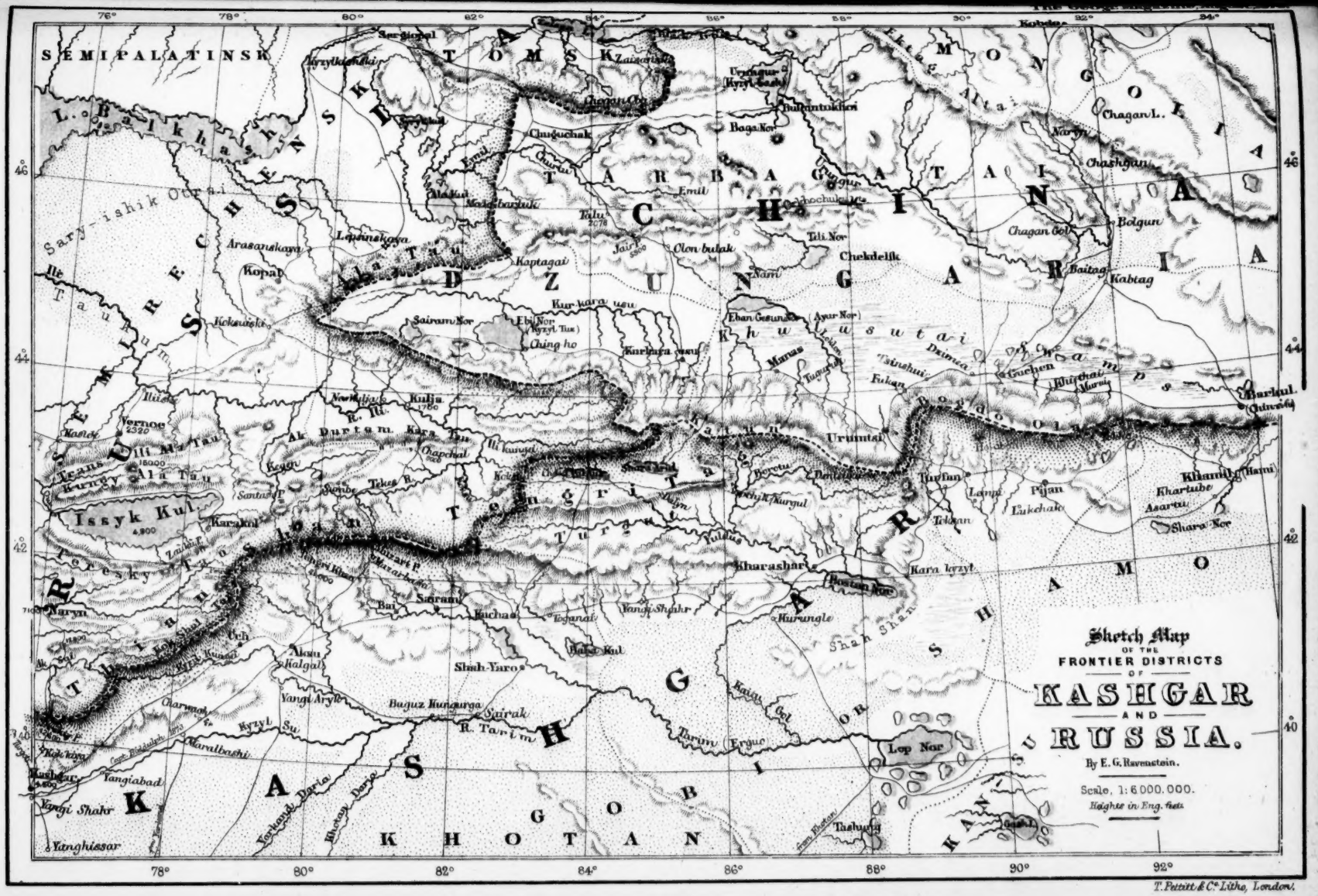
THE GERMAN AND AUSTRIAN ALPINE CLUBS will hold their Annual Meeting between the 27th and 30th of August, at Kempten.

DJETYSHAHR

(EASTERN TURKISTAN),

ITS SOVEREIGN, AND ITS SURROUNDINGS.

THE speculations which the newly-established Muhammadan State in Eastern Turkistan gives rise to, serve to intensify that interest in it which the treaty, lately so successfully negotiated by Mr. Forsyth, necessarily awakens in us as a commercial people. On the 2nd of February last, the Amîr Yakub-Khan of Kashgar affixed his seal and signature to a document which lays the foundation to a trade of great promise with a country hitherto completely isolated from the rest of the world. Nothing but the natural difficulties of the roads will now prevent the most free communication between India and Kashgar through Cashmere, political and fiscal barriers being entirely removed. In order to render Kashgar accessible from India by every southern route, it remains only for us to secure a right of way through the Affghan province of Badakhshan—a right of way which, in the interests of Affghanistan itself, will doubtless not be withheld from us by our friend and ally, the Amîr Shere-Ali-Khan. Indeed, it is fully time, for the advancement of that very trade in whose cause we have so boldly entered into diplomatic relations with the ruler of a country which was, ten years ago, a province of China, that we should begin to gather in Affghanistan the first fruits of a long series of heavy subsidies paid to its sovereign. We heard, not very long ago, that an influential Russian company of merchants and others were about to send a large caravan of Russian merchandise, by way of Khorassan, to Candahar and Cabul. Such a thing could surely not have been set on foot without the knowledge of the Amîr of Cabul; and most certainly the Russian company could not have undertaken the venture without receiving, through their Government, the sanction of the Amîr to enter into his territories. It is a well-known fact that no Russian caravan dare venture into a foreign country without the permission of the Russian Government; and to have received that is to have received the permission of the Sovereign of the State which is its destination. It were strange then, to say the least, if the markets of Affghanistan were thrown open to the sale of Russian merchandise before we secured so much as a right of transit for our own goods. We are by no means anxious to see the Russian merchant excluded from any field which might be thrown open to honourable competition; we have fought the giant monopoly in every corner of the world, and have, in his place, set up free trade—a twin sister of justice—for the benefit of all mankind; so that it were a betrayal of her cause even to throw impediments in the way of Russian trade, by whatever route it might be advancing, in Asia. None the less, however, should we feel aggrieved, if to us, who are his friends and allies, the Amîr should deny privileges which he accords to strangers. But it is also on other, more elevated, moral grounds that a high road of commerce should be opened through the eastern provinces of Affghanistan. These grounds are—the benefit which would accrue to trade, and the pacification and well-being of a country and people perpetually in a most odious state of revolution and anarchy, because of the political barriers which render them inaccessible to the civilizing influences of the



T. Pettitt & Co. Litho, London.

outside world. Time, stimulated and controlled by opportunity—even as the Muhammadan's *Kismet*, whatever he may say to the contrary, is moulded by himself—will doubtless effect all this; in the meanwhile we must hail, as a happy augury of the future, the foundations so happily laid for commercial relations with Kashgar, hoping that there, as elsewhere, the broad wedge of international commercial relations, by opening a wide cleft for fair and open rivalry in trade, will cause that smaller envenomed one, which but makes a split, to fall to the ground. On the prospects of a trade with Kashgar, and on the routes from India, we would refer our readers to Mr. Shaw's article in the *Ocean Highways* for August, 1872, and to the same Magazine for March, 1873.

The country whose independence has been recently recognised by two European powers—both equally bound by treaties with China—is, however, in an early nascent state as regards its political relations with the governments of those countries who have already recognised the sovereignty of its ruler. It may even be said that as yet Kashgar forms only the nucleus of a state standing over the still smouldering ashes of Chinese domination, for that domination still shadows forth hopes of rising again, phœnix-like, into existence in Eastern Turkistan, and in one direction, at least, there is as much indefiniteness as to its extent as there is in the tail of the present comet; while in another direction it simply loses itself in space. Now-a-days, with two such crushing, not to say all-absorbing powers in Asia as England and Russia, the inviolability of an intermediate smaller State must depend, perhaps, almost as much on its own power of resistance and natural bulwarks, as on the power of abstention from encroachment which its two trade-propelling neighbours may be able to exercise. We cannot, therefore, but feel very curious to know as much as we can learn, not alone about the markets of this country, but also of its military frontiers, and of that power to which, with Russia, we have lent the prestige which follows on our official relations with the sovereign. To this end we publish a small map with a delineation of the northern frontier from its extreme point in the west to as far east as the Amîr Yakub-Khan's territories are ever likely to extend. The western frontier may be said to be to all intents and purposes a wall of unscaled and unscaleable heights. It is to be understood that this is said merely in a metaphorical sense, for there are routes to Kashgar and Yarkand from Wakhan, Darwaz, and Kokand. Yet these may be said to be classical routes of bygone centuries, which have almost fallen into disuse since the cessation of the great movements of the various races of Asia, and their subsequent stagnation. Some time hence, however, the great powers of attraction of the West must produce a lively circulation through these arteries. The bulwarks on the south are composed of several parallel ranges of mountains and of wide, bleak spaces, which, while they render the country comparatively safe from invasion, offer difficulties to trade of a nature not more than sufficient to stimulate enterprise. From the south-west there is little danger of trouble or invasion, and the routes from Badakhshan, albeit one of them has become known to us through an agent of Mr. Forsyth, who pursued it on a journey from Kashgar to Cabul, are little frequented, and are, as yet, sealed to us.

Three weeks ago, the *Hour* published some highly interesting letters dated from Kashgar, written by Captain Biddulph, and in the July number of this Magazine there was a letter from that officer, and one from Colonel Gordon, which conveyed all the information which has, as yet, resulted from Mr. Forsyth's mission. This we can now supplement by a few observations on that northern line of frontier where the Amîr has been so diligently at work with his own hands since he first seized the reigns of government in the year 1865.

It strikes us as very strange that while we recognise Yakub's new title and dignity, styling him the Amîr Yakub-Khan, we have as yet not adopted any name for the country of which he is sovereign. We know that his sway extends to Turfan—nay, we have learned that he is even master of Khamil; we positively know that he has resided chiefly at Aksu, a large town and centre of a very large and important district, and yet the high contracting party to the treaty of Kashgar is acknowledged by us as the ruler of the territory of Kashgar and Yarkand alone. In the Persian duplicate of the treaty the Amîr is doubtless credited with a wider extent of dominion, and Kashgar and Yarkand are certainly meant to cover more territory than would be commonly inferred from names of only two cities,* with the outlying lands which they include, for we could not have involved ourselves in political relations with the sovereign unless we were assured that he held absolute and unmolested possession of the entire region known to us geographically as Eastern Turkistan. In the 14th or 15th century, under the Hodjas or spiritual Governors of Eastern Turkistan, descendants of Muhammad,† who established a ruling hierarchy, each Hodja ruling supreme in a separate town, the country was known as Altyshahr. This name has survived ages of Chinese domination. Altyshahr‡ means country of the *six* cities, including Kashgar, Yangi-hissar, Yarkand, Khotan, Aksu, and Ush-Turfan. This name the Amîr Yakub-Khan has changed; having seized Turfan, or Kuné-Turfan,§ and thus

* Yarkand and Kashgar have been adopted in this comprehensive sense from the circumstance of the name of the first city—derived from *Yar* or *Er*="territory," in the Turk tongue, and from *Kiang*=wide—signifying extensive country or territory. Peter the Great first heard of the abundance of gold sand in this place, which was then called Yar-Kian, *Er*ken or Er*kat*. According to Wells Williams, this city was called Yer *Kiang* by the Chinese; it was constituted their capital of the "Southern Circuit," and the Kiang was converted into the ordinary Kand or *Cand* by the Turks. This word or syllable always terminates with a *d* when the first vowel is *a*, as in this instance and in Samarcand; not so in Tashken*t* Chemken*t*. Kent is another form of the same word, meaning permanent habitation, village, &c., in use among the Kirghizes: thus Djan-*Kent*, the name of the ruins of a city called Yangi-Kent, by Abulfeda.

† For explanation of the origin of the Hodjas, see *Timkofski's Travels*, Note, p. 376, vol. i., where Hodja is written Khodjo; and see Burner's *Travels into Bokhara*, vol. ii., p. 227.

‡ "The divisions of Eastern Turkistan," which was the Chinese southern circuit, were regulated, in the time of the Chinese tenure of the country, by the position of the eight Muhammadan cities; these, as named in the Statistics of the Empire, were Harashar, Kuché, Ushi, Ohsu, Khoten, Yarkend, Cashgar, and Ying Keshar."—Wells Williams, vol. i. p. 178. But from the period of the first Hodjas, as said above, the name of Altyshahr was first adopted as including only the six western towns belonging to the Turk race of people, "over which the Chinese did not exercise any immediate influence in matters of Government."—*Michell's R. in C. A.*, p. 149, and see p. 124.

§ It was more probably after the seizure of Kara-shahr, that Yakub gave the name of Djetyshahr to his territories. Ush or

added one more city to the *six*, he has called his dominions the country of the seven cities, or Djetyshahr, and this name might have been appropriately applied to it on the first occasion of our recognition of its independent status. The towns or groups of settlements of secondary importance in this country, walled in or otherwise, are, according to Valikhanof, Faizabad; Khan-Aryk, and Ustyn-Artysh in the Kashgar district; Laba and Terektek in the Yangi-Hissar district; Burchuk, Maral-Bashi, Ser-i-kul, Yangi-Churpak, Gumah, Sanchja, Kilyan, Kargalyk, Tagbui, Kakyar, and Yularyk in the Yarkand district; Ilchi, Karakash and Yurunkash in the Khotan district; and Bai, Sairam, Kum-Cash and Aikul in the Aksu district; Valikhanof enumerated forty-two towns and settlements, besides the six chief cities of Altyshahr, and if it may be considered that he gives very nearly the full number, we cannot be very far out of our reckoning if we put down the figure of the settled inhabitants of the country at something like 500,000 at the outside. These, according to Mr. Shaw, are of the Aryan race, excepting the Tungans and the Chinese of whom there are still some thousand in the country. We cannot arrive at any correct estimate of the nomad population owning allegiance to the Amîr. Colonel Veniukof considers that Russia and Djetyshar conjointly own 850,000 of these nomads, of which number 710,000 fall to the share of the latter. This people are Dikokamenni, Kara or Black Kirghizes, otherwise called Buruts or Khilikizi by the Chinese who derive the latter name, not the origin of the tribes, from "forty maidens," written Kyrk Kyz.*

Besides all these there are some 50,000 Kalmuks, camping chiefly in the mountain valleys to the north of Karashahr.

With reference to the northern boundaries of Djetyshahr, as we will now call the territory under the government of the Amîr Yakub-Khan, it is curious to observe that the Russians claim, under their treaty with China (Pekin, 1860), the entire range of the Thian-Shan Mountains. Upon this treaty they base their claim not alone to the Naryn River, but also to the southernmost slopes of that range of mountains. They have already asserted their right of possession even on the Chatyr-Kul Lake—against which the present sovereign of Djetyshahr has made unavailing protests. Strictly speaking, this Russian claim under the treaty in question, may well be disputed; for, in the first place, the treaty never came into operation, remaining as regards the Thian-Shan section of the Russo-Chinese frontier quite as much a dead letter as did the protocol of Chuguchak of 1864, with reference to the Tabagatai line of boundary. In the second place, it is simply laid down in the treaty that the Russo-Chinese frontier shall pass from the Tengritagh, as far as the limits of Kokand. What these limits were remained to be ascertained, and the commission which was to have been appointed to survey the proposed line of frontier, and to map the country, one copy of the map to be held by the Russian Government and the other by the Chinese, was never organised. The matter dropped entirely, but succeeding years brought succeeding revolutions. In 1862 Lieutenant Protsenko demolished the then vacant Kokand fort of Kurtka, and others, on the Naryn; and gradually and imperceptibly the Russians have constituted themselves the successors to the Chinese line in the Thian-Shan from Chatyr-Kul to the Muzart, and, as Colonel Veniukof expresses it—"to say the least, as far as the sources of the Kunges."

One of the objects, if not the main object of the special Russian mission to Kashgar in October 1868, was to sound Yakub-Khan on the subject of the treaty of Pekin, and to discover whether, and on what conditions, he would agree to a delimitation which would advance the Russian frontier over two mountain ranges to the south of the Naryn, and bring it to the foot of the third. It appears that Yakub-Khan "showed a perfect indifference for international obligations." He would not father upon himself obligations to be interpreted for him of a treaty entered into by Russia with a government whose power he had aided in subverting. He was "recalcitrant," "obstinate," and had even the audacity to lay claim to the left bank of the Naryn. And, indeed, his envoy stated in Calcutta that the Naryn formed the boundary. Of Captain Reinthal's mission to Kashgar apparently nothing was known, even in 1869, if we may judge by the correspondence between the British and Russian Governments for that year, which was published in 1873. Even in St. Petersburg, judging from the same parliamentary papers, the memory of it seems to have been obliterated until 1870, after Shaw's and Hayward's journeys to Kashgar and Yarkand, when an account of it was published in the military journal.

We may, however, come to the conclusion that Lieutenant Hayward heard of Captain Reinthal's mission, and of the purport of it, from the following sentence, which occurs at p. 98 of his narrative of his journey to Yarkand and Kashgar in the *Journal of the Royal Geographical Society* for 1870: "Now, however, overtures have already been made to the Atalik-Ghazi to carry out the terms of this treaty of 1861; but he has decidedly refused to entertain such views, and holds that he is not liable for the fulfilment of any treaty entered into with the Chinese." Lieutenant Hayward proceeds to say that Russia considers Yakub an usurper, adding in a note that she categorically declines to recognise him, considering Yarkand and Kashgar as still belonging to China. She would, then, we presume, have done so if the Atalik-Ghazi, as he was then styled, had agreed to carry out the terms of the treaty of Pekin; overtly, it is true, Russia did not recognise the Atalik, but she received his envoy, the Mirza-Shadi, in 1868, at St. Petersburg, and sent an envoy of her own to Kashgar to negotiate with the ruler *de facto* of Eastern Turkistan.

Each succeeding Russian map shows an alteration in the line of the Russian frontier southwards; the great feature in the direction of Djetyshahr is now the absorption of Chatyr-Kul Lake. On this point Colonel Gordon's letter, in our last number, will be read with much interest; but, as he seems to have been greatly surprised by, and doubtful of, the accuracy of the reference to Chatyr-Kul as being "on the borders of Russia and Eastern Turkistan," some explanation is needed of his statement, which runs thus: "From what we heard on the spot, we are inclined to believe that practically the Torugat Pass range is the boundary, *i.e.*, the southern spurs of the Thian-Shan." We are at a loss to know whether Colonel Gordon means that a

Ush-Turfan is not to be confounded with the place called simply Turfan, and known as Kuné-Turfan.

* *Russians in Central Asia*, J. & R. Michell, p. 92.

Russian outpost is actually located on that pass during the summer, or, whether the Torugat Pass range is to be considered as limiting the Chatyr-Kul on the north. And yet by his own showing, and according to Fedchenko's map in the August number of *Ocean Highways* for 1873, the Torugat (there called Torugart) Pass is immediately south of Chatyr-Kul Lake.

We do not know the nature of the country lying between the Chatyr-Kul and the sources of the Aksai River, flowing through Aksu, but we may safely say that a footing on the Torugat or on the Chatyr-Kul is equivalent to a footing in the basin of the Tarim River, unless indeed Fedchenko's map requires correction in this direction, as would follow from Colonel Gordon's mention of the Naryn-Almaty road by way of the Terek Pass, lying east of Kashgar, in which case the sources of the Aksai may be found to be further separated from the basin of the Alpine Lake. Nevertheless, there is a road leading from the Arpa (probably the Ortagh mentioned in Davies's report) to the Chatyr-Kul, and from that lake into the valley of the Aksai; tracing it from the east, this is the road from the Zaùkù struck by another route from the Issyk-kul, west of Zaùkù, which we shall mention below.* We can close this part of our subject with a reference to Colonel Veniukof, who, writing in 1873, says: "South of the Issyk-kul the Russians have only one settlement—the Naryn fort—where there is a bridge across the river, and which is our most advanced post in the direction of the Kashgar territories." The Naryn-Almaty route appears to have been very jealously guarded by the Amîr Yakub-Khan, since his first accession to power. It seems, indeed, to have called his first attention after he had made himself master of Kashgar, Yarkand and Khotan. He aimed at diverting the traffic to the passes leading to Kuldja, so that it might be conducted, not through the Russian possessions, but farther east through the valley of the Tekes. The Russians seem quite as persistently to have endeavoured to frustrate him in this course, and ever since Valikhanof's journey across the Zaùkù to Kashgar, or later, since Reinthal's mission in 1868, they have paid particular attention to the routes from the eastern extremity of the Issyk-kul. While they have been labouring in clearing a road for wheeled carriages to the Naryn and beyond it—a work which has been thoroughly and admirably accomplished—they have done their utmost to encourage the despatch of caravans from Vernoë to Kashgar by the Zaùkù Pass.

On the Russian maps for the year 1871 the chief military station at the eastern extremity of the Issyk-kul was a place called Aksui, on a stream of that name. On the maps of the present day the very name of that place has disappeared, and Karakol, with a fort and a church, has appeared in its stead, nearer to the Zaùkù Pass.

To mention the routes leading from the north into Djetyshahr in their proper order from west to east, we must begin with the mountain track from Tokmak by Son-kul to the ruins of Kurtka Fort. Here there is no bridge across the Naryn, and the river is not always fordable. The road passes from the Naryn up the Aktala Rivulet, and either to the sources of the Arpa or to those of the Aksai—in the first instance over the Djaman-davan Pass, and in the second over the Bai Pass. Here we come out again on Chatyr-Kul: the distance from Tokmak is said to be 300 miles. The road from Vernoë across the Buam Pass is by far the best of all: as we have already observed it is now a carriage road, and has been used as such by a Russian officer, who, in 1873, drove all the way in a *tarantas* with the returning Kashgar Envoy from Tashkend. From the Buam Pass to Kashgar the distance is about 297 miles, from the Naryn 137 miles. A description of these two routes by Baron Osten-Sacken, with a map, will be found in the *Journal of the Royal Geographical Society* for 1870. The third route lies over the Kutemaldy Pass, at the north-western extremity of the Issyk-kul, and crossing three other passes, emerges on the Naryn Fort, from which there is a road leading over the Bogushty Pass across the Aksai Valley to the Terekty Pass, and so to Kashgar. This being shown to be the most direct and shortest road to Kashgar (140 miles from the Naryn), we must conclude that the last-named pass is not east of Kashgar, but north with an easting, as shown on Fedchenko's map. The fourth route leads from the Keregentash Pass east of the Ton (a southern tributary of the Issyk-kul), stretching north-east and south-west, first across the Little, then across the Great Naryn River, across the Karagai range to the sources of the At-bash, whence it passes over the Tus-asu Pass into the Aksai, and then by the Terekty Pass to Kashgar. This route, to the Naryn, was traversed by Captain Reinthal in November 1868, on his return from Kashgar. The road is somewhat difficult; the distance along it from the Issyk-kul to Kashgar is 213 miles. We have next Valikhanof's route from the Zaùkù—about 257 miles. From this point, on the Issyk-kul, there are roads to Ush, which are described by Humboldt and Ritter practicable for carriages from the Ishtyk and Bedel Rivers. Further east we find the route, or rather routes, for although not easy, but yet frequented, they are numerous, from the Tékés Valley to Aksu; these lie across the Kapkàk and Muzart Passes. The first lies to the west and the other to the east of the Muzart, which has been described from Colonel Shepelef's survey in the *Journal de St. Petersburg*, Nos. 186, 188, 193 for 1872.* It appears that Lieutenant Protsenko, who in 1862 and 1863 demolished several Kokand forts along the diagonal line of route south of the Issyk-kul, has surveyed most of the routes leading from the sources of the Tékés into Djetyshahr, but we have not seen any of his accounts. There is a MS. account by him under the title of *Routes into Kashgaria*, which we will look for in print in a year or two. We had almost forgotten to name the Djéparlé Pass west of the Zaùkù, mentioned by Valikhanof, of which the existence was some time ago repudiated by geographers. Farther east we come to several passes, more or less surveyed by Russian officers, of which the most important are those leading, on the one hand from the Koksu, a southern affluent of the Tékés, and on the other, from the Kunges, the eastern affluent of that river, into the Yuldus Valley, or basin of the Khoidugol or Kara-Shahr River.†

* It is, indeed, an ascertained fact that this line of route not only exists, but that it can be made available for wheeled carriages.

* *Vide* Mr. Vámbéry's digest of this in *Ocean Highways* for June 1873.

† See Valikhanof's *Alty-Shahr, Russians in Central Asia*, p. 120.

It may be gathered from our description that to Yakub-Khan's diagonal line of route with vertical lines of outposts, the Russians on the north will also shortly have a diagonal line, with outposts pushed far into the mountains so as to command all the northern points of ingress into Djetyshahr. This Russian advance will necessarily produce complications with the nomads, on whom the Amîr mainly depends, as we are informed by Colonel Gordon, for the defence of his frontiers. Yakub-Khan, minus his Kara-Kirghizes, will present a less bold front than he now does; and it is the knowledge of this that shows him the necessity of fortifying his cities. The Kalmuks of the Yuldus, who entertain anti-Muhammadan sympathies, might prove to be unreliable coadjutors in the event of a Russian demonstration in the north-east.

According to the latest accounts, the Chinese have retaken Manass: Urumtsi is said to be held by the Tungans under pledge of good behaviour to the Amîr. Turfan is at present in the hands of the sovereign of Djetyshahr, but that place, as well as Urumtsi, stands on that ancient coveted line of route, which even long before Hwen-Thsang's time, served as the highway of trade from Western China to I'gou or Khamil; we, therefore, expect to see even Turfan shortly change hands in order that communication between Russia and China may be free and unmolested.

Arguing from a study of the periodical alterations of Russian maps, we may even presume that in due time, as a matter of course, the limit to the extension eastwards of the Amîr's sway and Muhammadan influence will be fixed for him at Karashahr. Looking, then, into the future, as we cannot avoid doing when we are on the topic of this progressing portion of the world, we may say here *Kismet* ends, and iron will intervenes: Karashahr, which is on the point of the horn of the Amîr Yakub-Khan's crescent-shaped territory, being also an extreme point of the great Arc of that Aurora Borealis whose cold, clear light illumines *Kismet's* gloom from the north, while the warmer southern rays penetrate its misty shadows from an opposite quarter.

The line of road from Khamil to Turfan and Urumtsi is the Chinese section of the Amîr's frontier; the condition of affairs here, according to certain rumours, is calculated to awaken misgivings and apprehensions. These rumours, which were at first vague, seem now to be gaining ground, and are certainly disquieting. We refer to the reported intention of the Chinese to reinstate themselves in Eastern Turkistan, and to restore the old frontier of their Empire. Sooner or later, at any sacrifice, they are said to have determined to do this. Their ultimate success is little doubted by competent judges of their power and perseverance. If these apprehensions prove correct, we shall then have to consider the prospects held out in the future in place of those relations of great promise which we have inaugurated with the treaty. But truly, the question of the succession to Yakub's sovereignty, which now looms in the future, pales before the importance of the reported determination of the Chinese to invade his territories.

ROBERT MICHELL.

IMPRESSIONS OF JAMAICA.

CHAPTER II.—KINGSTON.

THE Land of Streams—this being the literal Indian etymology of the name "Jamaica"—was in a less visible degree worthy its title at the time of my visit than it would be at other periods; inasmuch as most of the rivers were dry. Rain had not fallen for many weeks; nor, as the inhabitants very well knew, was it likely to fall for some weeks more. On the first or second evening of my arrival in Kingston, as I was sitting in the verandahed piazza of Blundle Hall, vainly endeavouring to cool myself with iced lemonade, I mistook the rustling of the foliage on the cocoa-nut trees of the court-yard for another sound, and said to my companions, "Hark, there's rain!" There was a sort of staccato accentuation in the noise of those big leaves, moved by the punctual land-breeze, that exactly counterfeited the patter of large drops on the dry earth, at least to the ear of a stranger; but when I uttered the word "rain," everybody around laughed and told me the thing could not possibly be. And in convincing me that I was mistaken, one of my Creole friends impressed me deeply with a grave and lasting veneration for a chronometrical climate, when he said, "There's no rain at this time of the year; we shan't have it for twenty-six days." I duly timed this Zadkiel of the Caribbees in my diary; and sure enough, on the 27th morning after he had prophesied, there was a mighty fall of waters, which, after some hours' continuance, was followed by a distant roar. I was staying at a sugar estate called Seven Plantations, in Clarendon, nearer the high lands, at the time I now parenthetically speak of, and a young lady of my host's family said, "There's the river coming down." Down it came, with a rush, that very hour; and what had been a bare torrid channel of stones and sand, over which I had ridden that morning, was, at night, a broad stream not easily fordable. Those dry river-beds, pretty wide near the sea, puzzled me greatly when I made the first of my coast journeys out of Kingston, eastward towards Morant Bay. Long before I left the island all such strange appearances had given place to the more agreeable visions of clear waters, winding through feathery groves of bamboo and guava-trees, and wizard shapes of old volcanic rocks, clad with palms and orchids, with aloes and the broad-leaved caladium, and with a thousand other different plants which none but an accomplished botanist could distinguish. The same exactitude which marks the dry and rainy seasons in Jamaica is diurnally noticeable in the sea-breeze of the morning and the land-breeze of the afternoon, both which are as regular in keeping time as, in English communities, are the postman and the baker who brings the rolls for breakfast. If that more necessary refreshment, the health-laden breeze that comes blowing from the sea when the sky begins to burn with cloudless heat, should happen to lag but a few minutes, you look at your watch and say, "Dear me, the wind is late this morning." From January or February until June this regularity is most remarkable; and for at least fifteen weeks from the beginning of the year I never knew the morning breeze from the south-east vary so much as ten minutes. We expected it at half-past nine, and at half-past nine it was nearly sure to come. It gradually increases until noon, when it is strongest, and then it dies away,

ceasing entirely by five or at latest six o'clock. About eight in the evening is the time for the land-breeze, the influence of which extends 4 leagues or more off the coast. This breeze gains force until midnight, and then fades, being at an end by seven in the morning.

Wherever such regularity of climate is found, there will the disturbances be surely the most violent. No place in the world exemplifies the theory with more terrible force than does Jamaica, as we are historically reminded in passing Port Royal. I need not here recapitulate the many well-known facts of that terrible event, the great earthquake of 1692, which overthrew at once a city, arsenal, and fleet; which in a moment swallowed up 13,000 people; which caused infectious lakes to usurp the places of mountains, and which in altering the face of a country, altered, it has been said, the very climate. Along that wonderful line of coast, from Morant Lighthouse to the Palisades of Kingston, the evidences of enormous natural convulsions are plain. Nor are the same signs less frequent on the northern coast, which indeed abounds in volcanic traces, such as the vitrified lava called pumice-stone, which lies loose about the crater-like harbours of Lucea and Montego Bay. In the hurricane months of August, September, and October, it has happened within the observation of persons now living, that the water in those harbour-basins has suddenly disappeared, and, in less than a minute, has rushed in again. The connection of atmospheric with volcanic phenomena, though not clearly traced, may be inferred from their invariable coincidence. Where tremblings of the earth are so common that they excite no alarm, and very little comment, lightnings play incessantly in the night skies; and when rocks are rifted, and habitations overthrown, the sky is obscured, and thunder roars in fierce accord with the subterranean tumult.

In my first chapter of Jamaican impressions I spoke of that verbal change which adapts the service of the church to different conditions of existence. The variation I had then in mind was that of a sea voyage, when special forms of prayer are read. But far more impressive, because far more strange to my hearing, was that modification of the Litany which I heard for the first time when, the day after my landing, I entered the parish church of Kingston, which stands in the high part of the sloping town, and in a large, arid, sandy, stony, open square, called Central Park. Baptist and Wesleyan places of worship, also situate in this part of Kingston, are said to be much more numerously attended by the black population. Indeed, I had gone to the church remembering to have been told, or to have read somewhere, that the orthodox congregation did not, as in sectarian chapels, include any very large proportion of negro worshippers. My own observation strikingly confuted the statement. It is true I was a stranger, who had never before that time seen so many as a score of black people sitting together. But in order that I might not fall into any mistake by yielding to the mere effect of new appearances, I took pains to calculate the proportions of colour actually present, and found that they did not vary in any appreciable degree from the proportions which appear in the Census Returns of the population. In 1861 the numbers appeared thus:—whites, 13,816; brown or coloured people, 81,065; blacks, 346,374; total, 441,255. Many of the lighter-coloured among the brown population, however, had notoriously registered themselves as whites, and making no more than reasonable allowance for this harmless vanity, it is probable that the number of pure-blooded whites in the island of Jamaica did not then, and does not now, exceed, even if it reach, 10,000. There, in a church of old-fashioned rather than venerable aspect—it was built, I think, early in the 18th or late in the 17th century, and contains, among its most ancient monuments, the tomb of Admiral Benbow—sat a congregation as decorous, as attentive, and I will add as gaily and expensively dressed as any at the West End of London. On the whole, it was very like the church in which, as a small boy, I used to sit and long for one o'clock and the nursery dinner. The organ and the old responses sounded as they used to sound; the Rector, the Rev. Duncan Campbell, read and preached as I fancy I have heard other clergymen read and preach. But with this all familiar resemblance was completely at an end. Here, on the 21st day of January, my own birthday, in mid-winter, but with the thermometer at 83° in the shade, 5000 miles away from the friends with whom I had kept Christmas—here, with my sea-legs still inclining to sway under me when I stood up, and with my thoughts, alas! wandering far away from a devotional track when I knelt down—here I beheld a multitudinous flirtation of broad plantain fans, each fan fluttering against a jet black face. Every window was wide open, and tropical trees looked in and nodded at me, a stranger. But what was that which, as I have said, smote my ear with a strangeness greater than all? It was the prayer to be delivered by the Almighty Goodness "from hurricane and earthquake." The supplication occurred in the midst of those desires and petitions by which in England we seek Divine protection against lightning and tempest, plague, pestilence, famine, and other great calamities. From hurricane and earthquake the Jamaicans prayed most earnestly and most emphatically to be spared.

Before we landed at the Custom House Quay, our vessel had taken on board a Post-office Agent, who brought us news, it being then an anxious time. A phrase uttered casually by him, in a sort of apologetic detraction of the island, was, I afterwards found, rather usual among the inhabitants. When any Jamaican comments on a public act, or a state of public feeling, from which he himself mildly dissents, it is his habit to exclaim "Jamaica all over"! He says it in a pitying tone, distantly akin to love, perhaps, but bearing an ugly family likeness to contempt. It is, or was, "Jamaica all over" to live a little beyond one's income; to trust a good deal in Providence, a fertile soil, and what I have called a punctual climate; to neglect, waste, or misspend the natural riches which have been the envy of the world; to accept with resignation, or a sort of comfortable despair, the commercial bankruptcy which is almost regarded as the common lot. I am speaking of a period which, though recent, has been thrown into the background by a more hopeful state of things. Since Jamaica did the cleverest thing she had done for many a long yaer, and made herself a Crown colony, and since the Crown appreciatively recognized the compliment by sending her out a shrewd, energetic, cool-headed Governor, who left all his crochets, if he ever had any, behind him, she has been doing pretty well. But

vital changes—the changes of healthy material and moral growth—are at least as slow as they are sure; and we must be careful about accepting for gospel everything we hear about Jamaica's new turn of prosperity. When I was there, I saw a great many fine estates, and especially coffee-plantations, "ruinate" or "in bush." I do not hear that all or any of these have been taken in hand by capitalists or men of enterprise and industry. One of the most magnificent of these estates, covered with coffee-plants, which were themselves covered, when I rode through the luxuriant desert, with bright red berries, doomed to rot season after season, is said to belong to Greenwich Hospital. So I was told; and though I "don't know how true it may be," I have rather better reason for believing than for discrediting the statement. It was asserted—and here again I repeat the story with reservation—that letters had been written to the authorities of the Hospital in England, on the subject of this neglected plantation, which is only a few hours' ride from Kingston, in the mountains; and that no reply had ever been returned to anxious inquiries. The conjecture most in favour among the merchants of Kingston was that some careful purpose of avoiding legal acknowledgment of liability, in case of any outstanding claim, induced the owners or trustees of the abandoned estate to preserve a discreet silence. The greater the altitude at which the coffee-berry grows in Jamaica, the better its quality and the higher its price. When dried in the natural way on the stone barbecue, the mountain-berry is of a bluish tint; and the colour is so much esteemed as an indication of superior flavour, that it has often been counterfeited with the artful aid of indigo. The estate of which I have spoken is very high; almost exactly on a level with the famous plantation belonging to Dr. Hamilton, which is 4000 feet above the level of the sea, and near the summit of St. Catherine's Peak. This gentleman's land produces the best coffee in the Antilles. I had the curiosity to gather a sample of the unclaimed fruit, and to have it properly dried and prepared. Want of cultivation had somewhat impoverished the berry; but it was yet pronounced by the best judges to excel the average growths of a lower plateau, and to resemble in character the coffee grown by Dr. Hamilton. I shall have occasion but too frequent as I proceed with the record of these my Jamaican impressions, to speak of the lamentable loss of natural productiveness, "for want of labour," say the merchants and planters, but also, I must venture candidly to add, for want of intelligent action among the "buckra" class.

Kingston, as most people know, is a very out-at-elbows place; a shabby-genteel city that has seen much better days. Dilapidated, some people call it; but, etymological pedantry apart, I cannot well recognize the fitness of the word; for not only, as a literal fact, do the ruins of Kingston consist of anything rather than stones which have been cast down; they seem to be the mere remains of a one-storeyed, wooden, slovenly-built city, that has fallen a slow prey to dry-rot and a quick prey, partially, to fire. Port Royal, tradition credibly informs us, was indeed a stately city, beautiful as it was wicked; and the same is said, no doubt with equal truth, of Spanish Town; but I doubt if Kingston, even at the height of its fortunes, was a place of very imposing appearance. It is well placed, and well planned, the streets being broad and at right angles, so as to afford a good current of air. The town is built on a sandy plain, having an inclination to the sea; and at six miles distance are the Liguanea Mountains, whose name you must take care to pronounce "Liganee," on pain of being misunderstood with the utmost severity. The law courts and other public buildings not connected with the legislature—for the seat of government, I need hardly remind my readers, has been hitherto at Spanish Town—are in Kingston; but they are such unpretending structures that you may be excused for passing them by without notice. Harbour-street, in its quaint irregularity, and freedom from pretence to any order of architecture, is rather picturesque; and it derives additional comeliness from a finely-grown guinep tree at the corner and from two or three date and palm-trees which are visible here and there. A strange peculiarity of Harbour-street is that each house or shop, for it is the street of retail trade in Kingston, has an independent covered pavement in front; and, inasmuch as scarcely any two pavements are on the same level, you must walk out in the sun and the sand of the roadway, for want of a continuous footpath, if you are bent on pedestrianism. Near the guinep tree, just out of Harbour-street, at the principal end, is Blundle Hall; and of Blundle Hall, its memories and associations, I have to speak anon.

GODFREY TURNER.

(To be continued.)

ARCHÆOLOGICAL SURVEY OF INDIA.

1874.

IMPORTANT DISCOVERIES AT BHARAHUT.

THE Archæological Survey of India is engaged upon the investigation of questions which often have special interest for the comparative geographer. During the working season of 1874 General Cunningham, and his assistant, Mr. Begler, explored the greater part of the Central Provinces, and made some discoveries of very great importance amongst the Buddhist remains at Bharahut.

On the northern frontier of the Central Provinces General Cunningham explored the small States of Mahiyar, (Myhere) and Nagod. In the former State there is an old temple, dedicated to Saraswati, on the top of a lofty conical hill, three miles to the west of the town. The enshrined figure of the goddess has an inscription of four lines on the pedestal, and outside there is a long inscription of thirty-nine lines, which is unfortunately much worn by the weather. It opens with an invocation to Saraswati.

In the State of Nagod, which was formerly called *Uchahara*, there are several ancient sites, one of which, named Dhaniya-Majgowa, has yielded a number of copper-plate inscriptions, of which eight are now in the possession of the Raja of Nagod. These records belong to two different families of petty chiefs, of whom the principal representatives are Raja *Hastina* and his sons Sakshabhâna and Sarvvanâtha in one line, and Raja Jayanâtha and his son Sarvvanâtha in the other line. At *Bhubhara*, 12 miles to the west-north-west of Uchahara, Gen. Cunningham obtained a short record of the last-named prince inscribed on a stone pillar.

But the most interesting remains are at *Bharahut*, 6 miles to the north-east of Uchahara, 9 miles to the south-east of the Sutna railway-station, and 120 miles to the south-west of Allahabad. In our maps the place is called *Bharaod*, and General Cunningham believes that it may be identified with the *Bardaotis* of Ptolemy. It is the site of an old city, which only sixty years ago was covered with a dense jungle. In the midst of this jungle stood a large brick stupa, 68 feet in diameter, surrounded by a stone railing, 88 feet in diameter and 9 feet in height. The whole of the stupa has been carried away to build the houses of the present village; but rather more than half of the stone railing still remains, although it has been prostrated by the weight of the rubbish thrown against it when the stupa was excavated. When General Cunningham first saw the place only three of the railing pillars near the eastern gate were visible above the ground, but a shallow excavation soon brought to light some pillars of the south gate, from which he obtained the measurement of one quadrant of the circle. He was thus able to determine the diameter of the enclosure, the whole of which was afterwards excavated, partly by himself and partly by his assistant Mr. Beglar. In many places the accumulation of rubbish rose to 8 feet in height, and as the stone pillars were lying flat underneath this heap, the amount of excavation was necessarily rather great; but the whole work did not occupy more than six weeks, and all that now exists of this fine railing is now exposed to view.

This colonnade of the Bharahut stupa is of the same age and style as that of the great Sânchi stupa near Bhilsa. But the Sânchi railing is quite plain, while the Bharahut railing is profusely sculptured—every pillar and every rail as well as the whole coping being sculptured on both faces, with an inscription on nearly every stone. From the characters of these inscriptions, as in the similar case of the Sânchi stupa, the erection of the railing must be assigned to the age of Asoka, or about B.C. 250.

The inscriptions are mostly records of the gifts of pillars and rails, like those of the Sânchi and other stupas. But there is also a considerable number of descriptive records, or placards, placed either above or below many of the sculptures. These last are extremely valuable, as they will enable archæologists to identify nearly all the principal figures and scenes that are represented in these ancient bas-reliefs.

Amongst the numerous sculptures at Bharahut there are no naked figures as at Sânchi and at Mathura, but are all well clad, and especially the women, whose heads are generally covered with richly figured cloths, which may be either muslins, or perhaps brocades or shawls. Most of the figures, both male and female, are also profusely adorned with gold and jewelled ornaments, in many of which one of the most significant Buddhist symbols plays a prominent part. The earrings are mostly of one curious massive pattern which is common to both men and women. The *ankûs*, or elephant goad, was also a favourite ornament, which is placed at intervals in the long necklaces of ladies.

At each of the four entrances the corner pillars bore statues, each 4½ feet in height, of *Yakshas* and *Yakshinis* and of *Nâga Rajas*, to whom the guardianship of the gates was entrusted. Thus at the northern gate there are two male figures and one female, which are respectively labelled *Ajakâlaka Yakho*, *Kupiro Yakho*, and *Chadâ Yakhi*, that is, the Yakshas named *Ajakâlaka* and *Kupira*, and the Yakshini *Chandâ*. Other Yakshas are named *Suviloma*, *Virudaka* and *Gangito*, and a second Yakshini is labelled *Yakhini Sudasana*. On two other pillars there are male figures, each with a hood canopy of five snakes' head and each labelled *Nâga Raja*. These have their arms crossed upon their breasts in an attitude of devotion appropriate to their appearance on a Buddhist building. On two middle pillars there are two female statues, respectively labelled *Chukaloka Devatâ* and *Sirimâ Devatâ*, whom General Cunningham takes to be goddesses.

Amongst the scenes represented there are upwards of a dozen of the Buddhist legends called *Jâtakas*, all of which relate to the former births of Buddha. Luckily these also have their appropriate inscriptions, or descriptive labels, without which their identification would hardly have been possible. Amongst these *Jâtakas* are the following:—

(1). *Hansa Jâtaka*, or "Goose-birth," of which the only portion now remaining below the inscription is the expanded tail of a peacock, which must therefore have played some part in the story.

(2). *Kinara Jâtaka.* The Kinaras were a kind of demi-gods. Here two of them, male and female, are represented, with human heads and clad in leaves, standing before some human personage who is seated. The assignment of horses' heads to the Kinaras must therefore belong to a later date.

(3). *Miga Jâtaka*, or the well-known legend of the "Deer," in Sanskrit *Mriga*. General Cunningham calls it a deer and not an antelope, as is generally understood, because all the animals in this bass relief are represented with antlers. The King of Kâsi is seen aiming an arrow at the King of the Deer (Buddha).

(4). *Maghâ Deviya Jâtakam*, or "Magha Devi-birth." General Cunningham knows nothing of this story.

(5). *Yava Majhakiyam Jâtakam.* This title means literally the "mean or average amount of food" which was attained by daily increasing the quantity with the waxing moon and decreasing it with the waning moon. The bas-relief shows a king seated with baskets of grain (?) before him, each bearing a stamp or medallion of a human head. To the left some men are bringing other baskets. Barley *(yava)* would appear to have been the principal food in those days.

(6). *Bhisaharaniya Jâtaka.* A *rishi* (or sage) is seated in front of his hut, with a man and woman standing before him, and a monkey seated on the ground, who is energetically addressing the sage.

(7). *Latuwa-Jâtakam.*—The "Latwa-bird-birth."—This legend apparently refers to some story of a bird and an elephant, of which General Cunningham heard a curious version in Kashmir in 1839. In the bas-relief there is a bee stinging the eye, and a bird pecking the head of an elephant, with a frog croaking close by, while the elephant is treading on a nest of young birds. To the right the same (or a similar) bird is sitting on the branch of a tree over an elephant who is running away with his tail between his legs. Near the top the hind half of an elephant is seen rushing down some rocks. In the Kashmiri version an elephant while feeding throws down a nest of young birds into a stream, where they are all drowned.

The parent bird seeks the aid of the bees and mosquitoes, who attack the elephant with their stings, and having half blinded him he rushes off towards the stream, and plunging headlong down the rocks is drowned. The fable seems intended to show the power of combination. There can be no doubt that the two legends are substantially the same; and it seems probable that other Buddhist *Jâtakas*, still preserved in modern legends after the lapse of more than 2000 years, may be found. Perhaps this particular legend may be found in the *Pancha Tantra*.

(8). *Vitura punakaya Jâtakam. Vitura* may perhaps be a mistake for *Vithurâ*, "a thief."

Of illustrations of the life of Buddha during his last appearance there are some good examples. The earliest of these is a medallion containing Mâyâ's dream of the white elephant, which is superscribed *Bhagavato Ukdanti*. A second scene belongs to the reign of *Ajâta Satru*, King of Magadha, in the eighth year of whose reign Buddha attained *Nirvâna*. This is labelled.

Ajâtasata Bhagavato vandate.—Some of the well-known assemblies of the Buddhists would also appear to be represented, of which one is called the *Jatila Sabha*. A second probably belongs to a later period of Buddhist history, about midway between the death of Buddha and the reign of Asoka. This sculpture represents a large assembly, and is duly labelled.

Sudhamma Reva Sabha Bhagavato Chudâ Mahâ.—The words *Reva Sabha* probably mean the assembly or synod which was presided over by the famous Buddhist Priest Revato just 100 years after the death of Buddha, or in B.C. 378.

But the Bharahut sculptures are not confined to the legends and events connected with the career of Buddha, as there is at least one bas-relief which illustrates a famous scene in the life of Râma. In this sculpture there are only three figures, of which one seated to the left is holding out an arrow towards a male and female who stand before him—the latter being behind the other. These figures are labelled respectively *Râma* (the rest lost, but most probably *Chandra*), *Janaka Râja* and *Sitala Devi*. General Cunningham believes that this is by far the earliest notice that we possess of the great solar hero Râma and his wife.

General Cunningham looks upon the discovery of these curious sculptures as one of the most valuable acquisitions that has yet been made to our knowledge of ancient India. From them can be learnt what was the dress of all classes of the people of India during the reign of Asoka, or about three-quarters of a century after the death of Alexander the Great. We can see the Queen of India decked out in all her finery, with a flowered shawl or muslin sheet over her head, with massive earrings and elaborate necklaces, and a petticoat reaching to the midleg, which is secured round the waist by a zone of seven strings, as well as by a broad and highly ornamented belt.

Here we can see the soldier with short, curly hair, clad in a long jacket, or tunic, which is tied at the waist, and a dhoti reaching below the knees, with long boots, ornamented with a tassel in front, just like Hessians, and armed with a straight, broad sword, of which the scabbard is three inches wide.

Here also we may see the standard-bearer on horseback, with a human-headed bird surmounting the pole. Here, too, we can see the king mounted on an elephant, escorting a casket of relics. The curious horse-trappings and elephant-housings of the time are given with full and elaborate detail.

Everywhere we may see the peculiar Buddhist symbol which crowns the great stupa at Sânchi used as a favourite ornament. It forms the drop of an earring, the clasp of a necklace, the support of a lamp, the crest of the royal standard, and the decoration of the lady's broad belt and of the soldier's scabbard.

There are also houses of many kinds, and several temples, one of which is labelled *Vijayata pâsâde*, or the "Temple of Victory." There are animals of several kinds, as elephants, horses, deer, cows, and monkeys, and a single specimen of a real tapir. There are numerous crocodiles and fishes, and in one sculpture there is a very large fish, which is represented swallowing two boat-loads of men. There is also a great variety of flowers, and several kinds of fruits, amongst which the mangoe is very happily treated.

But perhaps the most curious of the Bharahut sculptures are a few scenes of broad humour, with elephants and monkeys as the only characters. In two of these an elephant has been captured by a band of monkeys, who have fastened a billet of wood along the inside of his trunk so as to prevent him from moving it. Ropes are fastened to his neck and body, the ends of which are pulled by monkeys, who are walking and dancing in triumphal procession to the sound of shells and cymbals played by other monkeys. The spirit of these scenes is very droll. A third scene represents the monkeys holding a giant by the nose with a pair of pincers, to which is fastened a rope dragged by an elephant. The action and attitudes of the monkeys are very good. The intention of all these designs is exceedingly spirited, but the execution is coarse and weak.

In the short inscriptions on the railing of the Bharahut stupa, General Cunningham found the names of the following places:— *Sugana*, or Srughna; *Vedisa*, or Bhilsa; *Pâtaliputa*, or Patna; *Kosâmbi*, or Kosam; *Nandinagarika*, or Nander; and *Nâsika*, or Nâsik; besides a number of unknown places, of which *Asitamasâ* is most probably some town on the river *Tâmasâ* or *Tamas*, the Tons of our maps.

From these inscriptions also General Cunningham has learned the names of several parts of the Buddhist gateways and railings, one of which is a new word, or at least a new form of word, not to be found in the dictionaries.

On the top of *Lâl Pahâr*, or the "Red Hill," which overhangs Bharahut, he obtained a rock inscription of one of the great *Kalachuri* Rajas, Nara Sinha Deva, dated in Samvat (Sake) 909. Altogether General Cunningham and Mr. Beglar have collected about twenty inscriptions of the *Kalachuris*, who took the titles of *Chedindra* and *Chedinarendra*, or "Lord of Chedi," and called the era which they used the *Chedi Samvat* and the *Kalachuri Samvat*.

They have also got an inscription of the great Chalukya Raja Tribhuvana Malla, who began to reign in A.D. 1076, and reigned fifty-one years. The inscription is dated in Sake 1008, or A.D. 1086, and the place of its discovery, Sitabaldi, confirms the account of his having conducted an expedition across the Narbada.

THE CAROLINE ISLANDS.

THE American mission in Micronesia has a station at Ponape (the *Bornebi* of Keith Johnston's Atlas), one of the principal islands of the Seniavine group, which is one of the many coral groups of the Caroline archipelago. These islands have, as yet, been only cursorily examined. They lie between 3½° and 9½° N. latitude, and extend over thirty degrees of longitude, between the Philippines and the Sandwich Islands, and north of the Solomon Islands and New Guinea. Islands here and there had been sighted, but there was a very imperfect acquaintance with the Caroline Islands until Captain Duperrey, in the 'Coquille,' sailed through the archipelago, and surveyed Ualan, the easternmost island. The Russian Captain Lutke, in his voyage round the world in the corvette 'Seniavine,' in 1828, visited each group of the Caroline archipelago, and acquired a good general acquaintance with their geographical position. The island of Ponape is the chief of the group, to which Lutke gave the name of "Seniavine." It is 50 miles in circumference, and nearly circular, with a peak rising to 2860 feet above the sea; and a surrounding coral reef, within which are many islets. The inhabitants, numbering about 2000, are of Papuan race. The American missionaries from the Sandwich Islands have established a station among these people, and they have a small vessel called the 'Star,' for visiting other islands of the archipelago, and introducing native teachers.

We have received from Mr. Damon, the venerable Seamen's Chaplain at Honolulu, an account of one of the cruises of the 'Star,' by Mr. Doane, one of the missionaries, which, as these islands are so rarely visited, is of some geographical interest.

The 'Star' left Ponape on January 2nd, 1874, sailing N.N.W. to Pakin, a small atoll, some 20 miles distant, with a population of from 75 to 100. This island is a dependency of one of the kings of Ponape—the people the same as those of that island and speaking the same language. The 'Star' passed close under its lee-shore, on the south side, and then headed away for N'gatik, or Raven, or the Seven Islands. N'gatik is the native name, and it is an atoll with some seven or eight islets on its reef. Its position is 5° 47′ 30″ N. lat. and 157° 32′ E. long. The island was discovered in 1773 by a Spaniard, and then re-discovered and re-named by other explorers, each one giving it a new name. The name Seven Islands was probably given from the seven islets on the reef.

This atoll is some 22 miles in circumference, with no passage to the lagoon save a boat passage near an islet on the eastern extremity of the reef—an islet without inhabitants. The natives of N'gatik are in stature and language Ponapeians; and so one might expect their complexion to be, only the "foreign blood" has so largely mingled with the native, that the native colour has been almost bleached out of it. The island has long been the home of foreigners, and painful are the reports afloat of "violence and bloodshed," of "sudden deaths in the lagoons and over the reef;" but they need not be repeated—"Let the dead bury its dead."

Children are numerous, light, and pretty. The missionaries offered to take some to Panope to be educated in their schools, but parents could hardly afford that: it was too far, and they had not mastered their distrust of the missionary. He *might* be a "man-eater" rather than a "soul-teacher," for such are the reports often made about him.

The island is fertile. The bread-fruit, cocoa-nut, sugar-cane, bananas, and onions were seen growing.

A singular piece of masonry was seen on this island. The base was about 12 feet square and raised some 5 feet, solidly laid, with rude steps for ascending. On this another square of less dimensions, some 5 feet square was laid; this again was crowned by a large square stone, which was capped with one standing erect with a crown piece of concave coral stone. This structure is sacred. Prayers and worship are here made to the island divinity, and the hill is free to any one to ascend and offer his devotions. On putting the question, if a missionary would be welcome, some replied "yes"; and it was affecting to see some gathering about one of our Ponape teachers, and holding her hand as if to pin her to the spot at once. The 'Star' then made for the Mortlock group, lying nearly due west from N'gatik. Her approach was in dead silence—not a canoe hastening off to trade with the strangers. It was not until the vessel was near the mouth of the passage that a canoe was seen, though she had run some 10 or 12 miles along the leeward shore, and why was this? The 'Carl,' kidnapping vessel, had been here a few years since, and had stolen a great number of natives. Mr. Doane says, "All hail to Her Majesty's Government for these kidnapped ones who have been restored to their homes. And yet while we shout this pæan of praise to John Bull, what shall be said of the Emperor of Germany, who suffered his flag to be unfurled to cover the coolie trade? Is it possible that Germany, which heads the van in the world's intellectual thought, is also to lead the coolie trade—a relic of the dark ages, a twin of American slavery? It is reported that eighty natives were taken from this island as coolies by a German vessel, to be returned in five years. How often were we asked by mothers and brothers, 'When will they come back?' And how often did we see strings enclosing the house of some one taken away. They are enclosed because sacred to him. No one may inhabit it. With this state of things, we were not surprised at the reception of the 'Star.' At first it was with such an ominous silence; but as she nears the mouth of the passage of the lagoon, a canoe is descried bearing down, headed by a foreigner, a trader, he assuring the natives that there was no danger. We soon met them with a boat, exchanged salutations, and they boarded the 'Star.'

"The first contact with these people prepossesses one in their favour; so mild looking, so gentle, and so far from rudeness that we often said, 'How kind, how woman-like they are'—not as a reproach, but as descriptive of their general bearing. 'Surely these are not savages!'"

The canoe of these islanders is in general style like the canoes of all the islanders of Micronesia, the ever present outrigger and timbers being fastened together by native twine. The dress of the islanders is simple. Their mills do not weave very finely or abundantly! The men wear the *maro*, a thick braid of cloth, about their loins; they wear also the poncho, made from the bark of the hibiscus, two breadths sewn together. It

extends nearly to the feet. The hair was done up in a top-knot style, ornamented by native beads, hair-pin and comb—this is a small piece of wood slitted into small fine teeth lengthwise, often carved, and cock's feathers sewn to the handle. Tattooing is simple, the arms from the shoulder to the elbow being thus ornamented, save occasionally a semicircle band run across the breast. Children go in undress. The women wear the native tapa, made from the bark of the hibiscus, plainly ornamented and dyed black for a background. The dwellings are simple, the roof being set on the ground, and resting on the eaves. There is a door at each end through which one may crawl, and the interior is dark and stifling. Close to this is the cook-house, black and filthy. Much of the cooking is done upon heated stones. It is with them yet the *stone age;* for nearly all implements of work, axes, knives, and the adze are made from this or something kindred to it—the shell of fish or turtle. Near the dwelling, or apparently in each community, is a building of larger dimensions than has been mentioned. It is a "hotel," a "work-house," a shelter for large *proas*, a play-ground for children, a campus for all meetings. It is rudely made, but strong. Large masks were found at Satoan, an islet of the Mortlock group. They seemed to be used by executioners, that they might do their duty faithfully, and remain unknown.

Mr. Doane then gives the following account of the islands of the Mortlock group :—

THE MORTLOCK GROUP.

Now that we have spoken of the Mortlock group, described the people and their customs, it remains only to speak of the separate islands. The group we have named was discovered in 1793, by Mortlock, who commanded the 'Young William,' and both names are given to the cluster, consisting of three atolls, separated by channels, from 5 to 7 miles in width, their names being Satoan, Etal, and Lukunor. The 'Star' visited Satoan first, which bears the name of the discoverer, but it is proposed to re-name the atoll from its most important islet, Satoan, it being the most fertile, most populous, and evidently the oldest land formation of the island. This change of name is proposed on account of there being no other island in all the group of sister atolls but which bears, as it should, a native name. Satoan lies in 5° 27′ N. lat. and 153° 30′ E. long. Two passages offer access to the lagoon, one on the south side and one on the north. The depth of the 'Star's' anchorage was 19 fathoms. Some 60 islets crown the reef of this atoll, some being several miles in length, and well wooded and fruitful; others mere pin heads in size. It was frequently observed that neither the reef proper nor land formation had the breadth of some coral islands in Eastern Micronesia. The bread-fruit, cocoa-nut, pandanas and other plants and trees abound here. Wild pigeons and smaller birds were seen. The population is computed to be about 1500. One islet, some 4 or more miles long, has a population of 600. The language of this island and of all its sister atolls, Etal, Lukunor, Namaluk, Losap, Nama, is the same. In leaving Satoan it may be remarked, early navigators have represented the natives as treacherous, "were not to be trusted, no matter how friendly they may appear." The 'Star' can deny that charge. From the first day of her anchoring to the last, here and at Lukunor, not the least treacherous sign was seen; nor indeed is it known that a single article was stolen. Yet natives were numerous on deck, going and coming, and visits were made ashore without fear.

Passing from Satoan, the 'Star' sailed across the lagoon, going out at the northern outlet. It is a lagoon of much beauty and safety, because so free from coral patches. Bearing N.N.E. in lat. 5° 38′ and 153° 24′ long. is Etal, distant some 7 miles, an island without a ship passage; but its reef is crowned with a luxuriant growth of vegetation on its islets. The 'Star' did not touch here. It is spoken of as a beautiful atoll. The population may number some 600 or more. The language and customs of the people are similar to those of Satoan, with which a free communication is kept up by large *proas*.

Passing by Etal, the 'Star' ran N.W. some 25 miles to Namaluk, whose position is 5° 55′ N. lat., 153° 13′ E. long. Approaching this island, three large islets were seen, crowning the reef, verdant, and apparently thickly wooded. The more than usual height of the trees seemed to give to the atoll an unusual elevation, as if partly heaved up by volcanic force. Reaching this island near sunset, there was no time for exploration; but, as the 'Star' passed along to the lee shore, groups of natives were seen sitting beneath the trees, watching the approach of the vessel, a sight to them no doubt strange, as not many ships touch here. This cautiousness of the people not to launch a *proa*, and "come off," indicated fear; and so it was, for here were found those who had been kipnapped by the 'Carl,' and taken to a Fiji plantation. Perceiving their unwillingness to come to the 'Star,' a boat was sent to them. Three friendly natives from Satoan accompanied, and going up to the group, told them who the strangers were—friendly missionaries. A few threw aside all fear, came to us and shook hands, heard a message, bartered a little, and then with a friendly "good-bye," were left. The language, customs, and tattooing, all were one with the Satoans. No ship passage; merely one large enough for a boat was seen. The population numbers from 300 to 500.

The day closing, the 'Star' filled away for Losap, N.W., distant some 60 miles. Its position is 7° 3′ 40″ N. lat. and 152° 42′ 20″ E. long. Nearing this atoll the natives were cautious as at Namaluk. Flogging on a Fiji plantation had no charms for them. It was observed that the island had the appearance of an unusual elevation as at the one just passed. Nothing like volcanic forces working in ages past could be seen. As the 'Star' neared the island, natives were seen walking on the beach; none came off. The boat was sent in, accompanied by the friendly natives of Satoan. A ship's passage was seen; there may be more on the west side. The boat passed into the lagoon, and passed up about half way to the landing-place of a high chief. The company were received with kindness, young cocoa-nuts being brought as a peace offering. The high chief was very friendly, and would gladly take a missionary teacher. All the surroundings of the people, their language, dress, *proas*, ornaments, tattooing, dwellings, the children in undress, and the women with the native tapa, showed they were kith and kin with the islanders already visited. The population may reach 500. The island

seemed fertile, and capable of furnishing plenty of food.

North-west of Losap lies the atoll Nama, round, small, and without lagoons; fertile, crowded with a forest of bread-fruit trees and cocoa-nuts—a tombstone in mid ocean of some buried mountain peak. The island is not put down in *Findlay's Directory*. It is some 10 miles N.W. from Losap. As the 'Star' neared this pin-head of an island, natives were seen grouped on the shore, apparently awaiting her approach. The landing is evidently on the west or lee side, over the reef in a smooth surf. But time did not permit us to send a boat. We learned from the natives with us that the population is small, some 150 or 200—if, indeed, amounting to that. The language and people are one with the islands south, at which we had touched.

LUKUNOR, THE GEM OF THE CORAL ISLANDS.

The 'Star' headed away from this people for Ruku, the higher mountain peaks of which were seen near sunset; but it was thought best not to sail on further, so she tacked about and headed for Lukunor, a sister island of Satoan, whose position is in N. lat. 5° 27′, and E. long. 153° 27′. And here we find, if I mistake not, the gem of the coral islands in Micronesia. The lagoon, comparatively free from coral patches, and the islets fertile, and so situated as to protect the anchoring ground, which has a fine bottom, and close in to the shore, if needed, and not deep, the contour of the atoll, the mildness of the people, all combined to make this a beautiful island. There is but one passage, though of easy access, on the south side. The island may be some 18 miles in circumference. Four large islets, not contiguous, nor very widely separated, crown the reef. On the main islet two large taro patches were seen, evidently highly cultivated, and divided off into sections, marking the ownership of each. And it was observed how much there was of a rude kind of fencing on the main land as if each one's little farm must be definitely bounded—a little ludicrous we thought, as the whole islet would not satisfy a western farmer for his plantation. Wild pigeons are more or less numerous, and a small bird, with cheery note, was seen. The houses and *proas*, the dress and ornaments of the people, the maro and poncho of the men, with the simple skirt of the women, and the nakedness of the children, and their language, marked this people as one with the Satoanites; and their proximity enables them to have frequent communication with each other. The population may be put down at 1500. The children are numerous, a hopeful sign for the future of the teacher located here.

Leaving this island, the 'Star' touched at Satoan for a few last words with the teachers there, and then laid her course for Nukuwor, or the Monteverde Island, located in N. lat. 3° 55′ and E. long. 154° 56′. This island was discovered by Monteverde, a Spaniard, in 1806. It is small, being not more than 12 or 15 miles round. It has a passage for small vessels. The reef was dotted with islets, some thirty crowning and adorning it. The natives are of Samoan descent. Their splendid forms marked this as well as their language. It has but little affinity with the islands of the north. The population is small, numbering some 150. In times past it has been larger, but feticide, so very common, has lessened it sadly. The natives seemed cheerful and lively, going off to a vessel, at rather a venturesome distance, for barter. Idols, carved from wood, are common here, a very large one being in their temple. This is probably the only people in all Micronesia who worship idols carved out. With all of them are stones, trees, animals, birds and fish, dressed and made sacred, but without the carved image. This fact seems to point to a different origin, for this people have retained the custom of their ancestors at the south, or have taken it from natives who may have drifted to them from the west. No opportunity was offered here to land, though the natives are friendly. A trader resides here. It is manifestly the iron age with this people, as iron hoop was eagerly taken in exchange for their small wares.

The 'Star' could stay here but a short time, as the day was fast closing. So, telling the venturous ones to return home, as a light was burning for them on the shore, we parted, they for their coral reef and we for the more ambitious high island, Ponape.

During all this cruise no accident befell the 'Star;' no demonstration of treachery from the natives; not even a nail was stolen. The teachers were welcomed and readily found homes among the people they sought to live with.

THE TREATY BETWEEN FRANCE AND TONQUIN.

IT appears from advices from Tonquin that the melancholy fate of Garnier has deterred France from annexing any part of Tonquin, or organizing a real mart on the Sonka River. But through the exertions of M. Dupuis, whose name as our readers will remember has been associated with the exploration of that important stream, a treaty has been negotiated, and by means of it commercial advantages of no slight value may be anticipated, the kingdom of Annam being thereby thrown open to European trade.

The principal stipulations are as follows:—

1. Three ports to be open for trading purposes, one being Hannoy in the province of Tonquin.

2. Europeans to be permitted to reside and possess real property in the above-mentioned ports, under the protection of a French Consul and a garrison of 100 men.

3. Foreigners to be permitted to travel in the interior without restriction, if provided with passports viséd by the French Consul.

4. Chinese goods to be allowed free transit through Tonquin.

5. The Roman Catholic religion to be allowed free exercise throughout the kingdom.

6. An indemnity to be paid by the Annam Government to Spain of 1,000,000 dollars.

7. The French Government to cede to Annam five steamers, each 500 horse-power, 100 field-pieces, and 1000 breech-loading rifles.

8. The Annam Government to apply to no other power but France for aid in case of rebellion or internal dissensions.

The above treaty was signed and ratified on the 14th of March, and proclaimed by a royal salute of 101 guns.

Reviews.

—:o:—

ANCIENT GEOGRAPHY OF INDIA.*

IF the early records of India yield little that can be called history, and no chronology, they certainly throw much light on comparative geography; and it is from this point of view that we propose to make a few remarks on the history of India by Mr. Talboys Wheeler. The present volume tells the history from a Hindu, Buddhist, and Brahmanical point of view, from the remotest antiquity to the arrival of the Portuguese; but it does not deal with the Mussulman conquests, or the Mussulman empire. Those subjects are reserved for future consideration.

The principal materials for a Hindu history are the hymns of the Rig Veda, the most ancient records in the world; the two great epics of the Mahá Bhárata and Ramayana referring to periods with a long interval between them; the life and teachings of Buddha; and the edicts of Asoka. As each of these records refer to epochs widely separated in point of time, they display to us the gradual movements of populations, and with them the changes in the physical aspect of India at different periods. Thus they convey some knowledge of the comparative geography of the country; and verify the conclusions of physical geographers and geologists.

India is divided into three zones, namely Hindustan Proper, Dekhan, and the Peninsula; which are formed by three lines running east and west; the Himalayan wall to the north of Hindustan, the Vindhyan range to the north of the Dekhan, and the river Krishna which separates the Dekhan from the Peninsula. Mr. Wheeler conjectures that the earliest tides of emigration followed the courses of the two monsoons; and that, in the remotest past, men from the unknown south and west of a bygone world were driven in rude craft by the S.W. monsoon from the southern and Indian oceans towards the western coasts of India. Then tides of Turanian invasion may have been driven, by the chilly blasts of the N.E. monsoon, down the valley of the Brahmaputra; and so gradually have spread over the country. Finally, in a later age, the Aryans on the N.W. seem to have entered the Punjab, and gradually spread their invasion over India. Of the two former immigrations no record exists. It is among the Aryans only that the memory of far distant events is preserved.

The Aryans of the Rig Veda were established in the Punjab, and their dominion extended to the Saraswati, between the basins of the Indus and the Ganges. They gradually made themselves masters of the greater part of Hindustan, and then filtered towards the south, carrying Aryan civilization and culture amongst the Dravidian (Turanian) population of the peninsula.

In the earliest dawn of history we find the Aryans with their boundary on the banks of the Saraswati. Beyond were the rich valleys of the Jumna and the Ganges, two streams which, after uniting at Allahabad, the ancient Prayága, form the mighty river which has deposited a delta of inexhaustible fertility, and finally falls into the bay of Bengal. We learn from the phenomena of the Ganges that, 4000 to 5000 years ago the sea, or at least the tide, extended as far as Rajmahal, and that Bengal Proper was a vast bay or lagoon, like the Rio de la Plata in South America. The gradual raising of the delta, which caused the lower part of the Gangetic basin to become inhabitable, is indicated by the positions of the capital cities which were first on the Saraswati, and were established lower down the Ganges valley by successive dynasties, as the progress of the physical changes rendered the former lagoons and swamps fit places for the abodes of men.

Prayága, the modern Allahabad, from its strategic position at the junction of the Ganges and Jumna, was looked upon as the centre of Hindostan, the holiest place of sacrifice for the Rishis, and the most commanding stronghold for the Kshatriyas.

The first cities really in the plains were Indraprastha (Delhi) on the Jumna, and Hastinapura on the Ganges, at the northern entrance of the two valleys. Then a long period elapsed. The second line was half way down the two valleys, and connected four more advanced positions, namely, Agra on the Jumna; Kanouj on the Ganges; Lucknow on the Gumti; and Ayodhya on the Gogra. At a later date Patali-putra (Patna) became a great capital. Then, as the delta became inhabitable, the city of Gour arose near the point where the main stream diverges into the Hugli and Ganges; and finally Dacca was built in 1604.

Thus, in 3000 B.C., the only practically inhabited part of the alluvial plain of India was the water-parting between the Sutlej and the Jumna. The rest has only gradually become fit for man's occupation within the historical period, and hundreds of square miles of the delta have become inhabitable since the days of Clive.

This gradual progress is admirably brought out in Mr. Wheeler's narrative; and shows the great value of historical and archæological researches to the student of physical geography. The fifth chapter of this volume contains an interesting narrative of the journeys of the two most famous of ancient Asiatic travellers, Fa Hian and Hiouen Thsang, the records of which are of such importance in the study of early Indian topography. Of the historical value of Mr. Wheeler's work we have not ventured to speak; but we can confidently say that it is a really important guide to the student of Indian comparative geography.

* *The History of India: Hindú, Buddhist, and Brahmanical.* By J. Talboys Wheeler, Secretary to the Chief Commissioner of British India. (Trübner, 1874.)

ON THE ROAD TO KHIVA.*

THE appearance of this book about the same time as that of a work of a similar nature and scope—we mean Mr. MacGahan's volume on the Khivan Expedition—provokes, if not comparison, at least a feeling of regret that, with all his advantages, Mr. Ker, the author, was not more successful in his endeavour to join the expeditionary forces and witness the campaign. He had on his side youth, an athletic frame and good constitution, plenty of money, considerable experience in travel, having journeyed in Brazil, Egypt, Arabia, the Holy Land, and other countries, a good colloquial knowledge of foreign languages, and last, but not least, abundance of energy, a superfluous portion of which he worked off during his detention at Kazalinsk on the Jaxartes, by a rather purposeless

* *On the Road to Khiva.* By David Ker, late Khivan Special Correspondent of the *Daily Telegraph*. H. S. King & Co. 1874.

16 miles walk in the desert and frequent swims across the river. But Mr. Ker never succeeded in getting nearer to Khiva than Samarcand, and though it is not quite clear that he let slip any good opportunities on the road, he was certainly much too late in the field, a blunder most probably attributable to the fault of his employers.

The author started for Khiva on the 8th of March, 1873, travelling by way of the Black Sea, Poti, and Tiflis. Having learnt here that the western expeditionary columns had already started, he shaped his course for Orenburg and Fort Kazalinsk, at which not over interesting place he was stopped by the Governor, and not allowed to proceed until the necessary permission had been obtained from the Commander-in-Chief. The fact was, Mr. MacGahan's plucky ride across the desert, in defiance of all opposing orders, had whetted the vigilance of the officials, the commandant at Fort Perovsky having been actually court-martialled for not stopping him, though we are glad to learn from MacGahan that General Kaufmann, with a generosity which does him credit, not only afterwards reinstated the commandant, but even gave him a higher post.

For upwards of fifty days Mr. Ker was kept in durance at Kazalinsk, but the time does not appear to have hung heavily on his hands. There is a great deal of *character* in Central Asian towns; and the mixture of numerous races, the quaintness of the buildings and bazaars all afforded him material for his pen; and in his descriptions of these he shows considerable liveliness, humour and appreciation of the picturesque. On one occasion indeed a rare chance of attaining his end presented itself. The 'Samarcand' steamer, one of the Aral flotilla, arrived at Kazalinsk with the Grand Duke Nicholas, General Verevkin, and other officers on board. The author at the suggestion of Lieutenant Stumm (the only foreigner besides Mr. MacGahan, who succeeded in reaching Khiva), applied for a passage in the vessel to Kungrad, and through the kindness of the young Grand Duke this was at first granted, only, however, to be revoked immediately after on the ground of an English passport not being admissible. But through the intervention of a friend leave was obtained for Mr. Ker to proceed to Tashkend. Tashkend is a place where apparently civilization is making great strides. There are hotels, cabs, luxurious gardens with pavilions and shrubberies impervious to the mid-day sun, streets like well-planted avenues intersected by rills of water, and lastly an officers' club, where the author and his companion got clear soup and cutlets.

From Tashkend Mr. Ker crossed the eastern angle of the Kizil-Kum and the Syr Daria, travelled through Chinaz and the gates of Tamerlane, forded the Zerafshan, and entered Samarcand. Of this famous city he remarks:—

> Fallen as it is from its former high estate, the city of Timour still ranks high among the commercial centres of the East. Merchants come to it from distant countries, and among the motley throng in its market-place you may notice at times the slim, graceful, high-bred Arab, or the pliant limbs and smooth, obsequious face of the Bengalee. European goods of every kind are largely imported, and skins, knives, carpets, silks, embroidered saddles, &c., are exported in vast quantities. The city itself is surrounded by a massive wall, containing six fine gateways, and enclosing an enormous space of ground. With respect to the population, I am inclined to regard the official estimate of 30,000 inhabitants—made at the time of its capture in 1868—as an under-statement; but it is always difficult to ascertain the population of an Asiatic city (especially one so fluctuating as Samarcand) with any accuracy.

At Samarcand great hospitality was shown to the travellers by General Abramoff, and they occupied themselves in visiting, among other sights, the grave of Timur. The grand sepulchre, with its magnificent pointed archway in front, its majestic dimensions and absence of meretricious ornament, appears to have fully impressed the author. The University of Samarcand—where however, they learn little beyond scraps of the Koran—presented the appearance of a disused cellar inhabited by a gang of thieves. A chapter is devoted to a spirited description of the siege of Samarcand, in which a resolute garrison of 600 Russians successfully kept off a motley army of Sarts, Bokhariots, Shehri-Sabzians, and Persians, numbering no less than 20,000, till General Kaufmann came to raise the siege.

Of course, the author contributes his views of the Central Asian question, and in the main we agree with them. He predicts that Kokan, Bokhara and Kashgar, will eventually fall beneath the advancing wave of Russian power, but the annexation of Kuldja and the making of roads through the Tian-Shan, he thinks, points indubitably to the *next* move, which will be directed towards China. The only observation we would make on this subject is that the course of events are doubtless shaping themselves towards a collision between Russia and China; but that the actual *casus belli* will probably break out far away to the east, on the Amur. In such a case, the Amir of Kashgaria would gladly co-operate with the Russian arms, and gain their favour. But Russia will never brook a Muhammadan ally in her wars, and her policy will doubtless be to coldly discourage the Amir, till a more favourable opportunity should occur for annexing his dominions.

Mr. Ker uses language of too strong a character when he sees in the manner of the Government of Kazalinsk, for the hundreth time, the under-current of deep hatred that boils up against us below the smooth surface of diplomatic courtesy. The unanimous testimony of Englishmen, as well as foreigners, who have seen much of Russian military society, convinces us that their officers are perhaps jealous of us, but that in their minds there is too much of admiration for our energy and bravery for any substantial dislike to be harboured. In conclusion, we would express our pleasure at the lively manner in which the author writes; while his fund of good stories will, we predict, always make him a pleasant companion to those with whom he undertakes future travels.

REPORT UPON THE RAINFALL OF BARBADOS, AND UPON ITS INFLUENCE ON THE SUGAR CROPS, 1847—71. By *Governor Rawson, C.B.* (Ordered to be printed by the House of Assembly.) Barbados, 1874.

BARBADOS is an island containing 166 square miles, situated in 13° N. latitude, and about 80 miles outside, and eastward of the belt of islands forming the windward portion of the group which encircles the Caribbean Sea. Its primitive forests have disappeared, and it presents one vast cultivated field of sugar-cane, food grain, and root crops; the highest part being 1147 feet above the sea. The island is exposed to the trade winds, varying but slightly from N.E. during three-fourths of the year,

and the rain comes chiefly from the same quarter. The present Governor has done very excellent service to the island, by the preparation of this valuable report on the rainfall of Barbados. For the purposes of his enquiry he divides the island into six districts, three on the windward and chiefly highland portion, and three to leeward. There is a station for observing the rainfall in every square mile on the island.

The mean rainfall of Barbados is established, on an average of twenty-five years, at 57.47 inches. The driest month is March, when the average rainfall is about 1¼ inch; and the wettest is October when the average is nearly 9 inches.

One of the objects of the Report is to assist those who are interested in calculating the probability of coming seasons; but its chief aim is to apply the information, very carefully collected, to an examination of the influence of the rainfall on the staple crop of the island—the sugar crop. This crop now nearly doubles the highest before the emancipation. It is not affected by other causes, so that its present dependence on the rainfall may be clearly traced and measured. The yield in 1869 was 32,150 hogsheads of sugar. The Governor's conclusions are that the rainfall influences the crop of the following year, but not that of the current year, and that a dry season injures the crop by one-fifth more than a wet season benefits it. This system of comparing the relation between the rainfall and the crops (especially sugar) may be of service to the agriculturalists of other countries, who will derive some useful materials and suggestions from Governor Rawson's very able Report.

———:o:———

THE RUDIMENTS OF PHYSICAL GEOGRAPHY FOR THE USE OF INDIAN SCHOOLS; together with a Sketch of the Physical Structure and Climate of India. By *Henry F. Blanford, F.G.S.* (Calcutta, 1873.)

MR. BLANFORD has prepared this excellent little text book of physical geography for the use of Indian students. It was found that the text books now available deal more especially with objects familiar or common in Europe, and have but few references to such as are interesting and familiar to the Indian learner. The present treatise has, therefore, been written with the object of interesting students in India, by illustrating facts in physical geography through phenomena and places which are known to them. The concluding chapters give the only popular description that has yet appeared of the geology and climate of India. On these subjects there is no one who can speak with more authority than Mr. H. F. Blanford, who has served on the Geological Survey, and has for some years been in charge of the meteorology of Bengal; and it is very desirable that his excellent little work, certainly the two last chapters, should be re-published in this country.

———:o:———

PETERMANN'S MITTHEILUNGEN.

No. VII., 1874.

DR. JOSEPH CHAVANNE, of Vienna, contributes the following interesting paper, based almost entirely on meteorological considerations, on the probable existence and character of the undiscovered Arctic Regions:—

THE ARCTIC CONTINENT AND OCEAN.

Our means of solving the great Arctic problem have been much enriched during the last five years by the work of the Norwegians, Swedes, Germans and Americans, and the general tendency of these results is to confirm, in a remarkable manner, the opinion put forward by Dr. Petermann, respecting the existence of an Arctic Continent, and of an occasionally open Polar Sea northwards of the 80th parallel of north latitude. Very valuable light is also thrown on the question by the scientific observations of Hayes and Kane in Smith's Sound, of McClintock in Port Kennedy, of Sievert Tobiesen on Bear Island, and of Wrangell in Nishne Kolymsk. The writer has, however, not failed to examine every authority, from the time of Barents down to Weyprecht and Payer, at present in the far north, so as to consider the question from every standpoint of view.

Looking at the map, we find that from 30° E. eastwards as far as 90° W. longitude, "the unknown region" extends northward of the 77th parallel of latitude, while from 90° W. longitude eastward, as far as 30° E. longitude, Grinnell Land and Greenland jut out northwards beyond 83° N. latitude, while Spitzbergen and Gillis Land reach the 80th parallel. Nothing definite is known of the mysterious region which lies to the north of these limits. In Petermann's map of the Arctic and Antarctic Regions (Map No. 5 of 1865) the continuation of Greenland is shown in the likeness of a broad strip of land from 30 to 70 miles (German) in width, and extending right over to Cape Yakan, while the remaining space, over 120,000 square miles in area, is shown as sea. This view, to a certain extent, received confirmation from Captain Long's discovery of the land north of Behring Straits; and the more recent journeys of Johannesen, Mack, Ulve, Leigh Smith, Torkildsen, Payer and Weyprecht, bear witness that the sea between Spitzbergen and Novaya Zemlya is not unfrequently navigable.

The precise questions which the writer now seeks to elucidate are the following:—1stly. Does the land north of Behring's Straits form a continuation of Greenland, or does the latter continent end north of Shannon Island, and trend away to the north-west? 2ndly. What is the extent of the land north of the 80th parallel on the American and on the Asiatic side? 3rdly. Is Grinnell Land an island or connected with Greenland?

The isothermal lines of temperature, the difference between the year's average of heat and cold, the distribution of wind as well as its temperature and direction, as observed at different stations situated along the edge of the vast crater-shaped mass of land which bounds the Arctic regions to the south, will enable us to answer the above questions satisfactorily.

Were the Polar region northward of 80° north latitude one uniform ocean, we should expect, as we proceeded northward, judging from the climatic effects of the Gulf Stream, and other ocean currents, a uniformly decreased difference, or, in other words, an approximation between the winter and summer mean temperature, a tendency on the part of the point of extreme cold to coincide with the geographical pole, a pervading dampness and comparative mildness in all north winds, and a modification or assimilation between the characteristics of the Polar and Equatorial currents. A glance at the following tables will dissipate notions of this kind:—

THE MEAN TEMPERATURE OF WINTER AND SUMMER IN THE ARCTIC REGIONS.

Between 30° W. and 30° E. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Reikiavik	—1.8	11.0	12.8
Stykkisholm	—3.0	8.0	11.0
Eya Fiord	—6.2	7.7	13.9
Petersburg	—8.1	16.0	24.1
Mean	—4.8	10.7	15.5

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Vardö	—5.5	8.2	13.7
Vadsö	—9.0	7.5	16.5
Hammerfest	—5.1	10.0	15.1
Hayö	—7.3	6.2	13.5
Magerö	—4.7	6.4	11.1
Bear Island	—13.2	4.8	18.0
Mussle Bay	—15.7	5.4	21.1
Ice Fiord	—14.6	4.0	18.6
Mean	—9.4	6.6	16.0

Between 30° and 90° E. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Kola	—8.6	14.4	23.0
Archangel	—12.1	14.1	26.2
Beresof	—21.4	14.5	35.9
Mean	—14.0	14.3	28.1

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Matochkin Sharr	—19.0	3.6	22.6
Rock Bay	—16.0	2.0	18.0
Shallow Bay	—14.6	4.0	18.6
Tobiesen's Winter Harbour	—23.3	3.2	26.5
Mean	—18.2	3.2	21.4

Between 90° and 150° E. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Yakutsk	—38.2	14.9	53.1

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Taimir Land	—25.7	7.3	33.0
Ustyansk	—37.8	8.2	46.0
Mean	—31.8	7.8	39.6

Between 150° E. and 150° W. longitude.

From 60° to 70° N lat.	Winter.	Summer.	Difference.
Nishne Kolymsk	— 31.0	10.6	41.6
Ikagmut	— 17.3	15.2	32.5
Kotzebue Sound	— 21.9	6.7	28.6
Mean	— 23.4	10.8	34.2

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Point Barrow	— 27.8	3.4	31.2

Between 150° and 90° W. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Fort Yukon	— 31.1	15.4	46.5
,, Franklin	— 27.1	10.1	37.2
,, Confidence	— 30.5	9.0	39.5
Cambridge Bay	— 36.3	3.1	39.4
Felix Harbour	— 32.6	4.9	37.5
Mean	— 31.5	8.5	40.0

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Camden Bay	— 31.5	2.2	33.7
Walker ,,	— 27.7	3.8	31.5
Mercy ,,	— 34.0	1.7	36.3
Prince of Wales Strait	— 35.1	2.6	37.7
Winter Harbour	— 34.3	2.8	37.1
Cape Cockburn	— 38.1	2.0	40.1
Dealy Island	— 35.0	1.2	36.2
Griffith's ,,	— 33.9	1.3	35.2
Northumberland Sound	— 37.2	0.6	37.8
Port Kennedy	— 37.3	3.1	40.4
Wellington Channel	— 37.4	1.1	38.5
Beechey Island	— 33.5	2.0	35.5
Port Leopold	— 35.5	1.0	36.5
Mean	— 34.7	2.0	36.7

Between 90° and 30° W. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Fort Hope	—31.7	4.4	36.1
Winter Island	—29.1	1.7	30.8
Igloolik	—29.6	1.6	31.2
Lichtenau	— 4.8	7.6	12.4
Godthaab	— 10.0	4.8	14.8
Jacobshavn	—17.4	5.8	23.2
Mean	—20.4	4.3	24.7

From 70° to 80° N. lat.	Winte	Summer.	Difference.
Port Bowen	—31.7	2.4	34.1
Sheriff's Harbour	—32.2	1.9	34.1
Port Foulke	—29.5	2.7	32.2
Rensselaer Harbour	—35.0	0.7	35.7
Wolstenholm Sound	—33.7	3.3	37.0
Upernivik	—24.7	3.4	28.1
Omenak	—20.7	6.9	25.6
Mean	—20.6	2.8	32.4

Taking the above figures as a basis, the mean winter temperature at the North Pole would be 28·8 C., in summer —1·7, and the difference 30·5 degrees. As in the case of the first, eleventh, and twelfth of the above groups the range of temperature increases as one goes northward, one may fairly expect that to the north of these regions (*i.e.*, north of Spitzbergen and Smith's Sound) land is to be met with. The comparatively high summer temperature at Nishne Kolymsk, Spitzbergen, Kotzebue Sound, at Port Barrow, and in Polaris Bay, taken in conjunction with the proximity of the point of greatest cold, is an additional argument towards the existence of an extensive Arctic continent. This is further confirmed by the range of maximum and minimum temperature, which at Bear Island, at Tobiesen's winter quarters in Novaya Zemlya, at Mussle Bay, Port Kennedy, and Rensselaer Harbour, actually amounts to an average for the five stations of 52·8 degrees.

The wind temperature is of great importance, affording as it does (as Maury remarked) a sure indication of the climate of the region whence it comes, while as it is affected in a great measure by the geographical features of the same, we may assume that it conveys information on this head as well. It is thus absolutely necessary to take into consideration the general character and dimensions of the land over which the winds blow, for to leave this out of sight leads to the formation of wrong conclusions respecting the comparative warmth and low pressure of the northern winds at various points along the north coast of Europe. At Port Kennedy, Rensselaer Harbour, and on the north-west coast of Novaya Zemlya, the south-east and south-west winds, which are the warmest, are accompanied by very high atmospheric pressure, the fact being that north of 70° N. latitude the maxima and minima of the barometer and thermometer are not so uniformly opposed to each other as we in more southerly regions are accustomed to find them.

At Bear Island, in Ice Fiord (as well as Mussle Bay), in Tobiesen's winter quarters in Novaya Zemlya, at Yakutsk, Port Kennedy, Godthaab, and Reikiavik, it will be seen from the table on the following page, that in winter north winds reduce the temperature from 0.2° to 4.5° below the mean. At Bear Island the cold is greatest with a north-north-east, in Ice Fiord with a north, in Novaya Zemlya, at Tobiesen's winter quarters, with a north-east, and Yakutsk with a north wind; while proceeding eastward along the northern coast of Asia, the cold winds shift round to the west, at Nishne Kolymsk the temperature being lowest with a north-west, and at Port Kennedy, with a north-north-west wind. Again, fourteen degrees eastward, at Godthaab, it is the north-east, and at Reikiavik, the north wind which is coldest. This is accounted for by the fact that the coldest winds come from the heart of the Arctic continent. Moreover, northwards of Bear Island and Spitzbergen, Nishne Kolymsk, Godthaab and Reikiavik it is exceedingly probable that land exists (and not, as the Swedes and English so strenuously assert, an immovable *mer-de-glace*) because the north winds in summer at those stations raise the temperature above the average, a feature which, in the absence of local or other causes, is due to the isolated or sea-girt character of the Arctic region.

Turning to the question of the northern limits of Greenland, it will be remembered that Clavering and Sabine sighted the coast as far as 76° N. latitude, and the Germans in sledges as far as 77°1', while Barrington gave it as his opinion that it had been discovered to extend as far as 79°30, and probably stretched still further in a N.N.E. direction. Judging from its steep and mountainous character, Dr. Chavanne would incline, by the light of the atmospheric data, to think that Barrington was right, and that Gillis Land forms a promontory of the Arctic continent, the former lying two or three degrees of latitude north of the former. This is corroborated by Parry's journey in 1827, and Payer and Weyprecht's a few years back, all of whom

met masses of ice covered with vegetable matter, drift-wood covered with mud, animals rarely seen except near land, and a uniform diminution of depth in the soundings. The absence of icebergs, and the rapidity with which, as Parry tells us, the masses of ice were borne southward by the current north of Spitzbergen, proves that towards the Pole the land assumes a flatter character and lower level. Duner informs us that from the north coast of Spitzbergen the birds fly northward. Wrangell Land, seen by Kellett, and re-discovered by Long, from its abrupt mountainous character may be assumed to be a continuation of Greenland. Clarke also, the successor of Cook, argued that an Arctic land must lie northward of Behrings Straits from the southerly flight of birds of passage.

The southerly current in Robeson Channel, the fact that the tide rises sooner in Newman Bay than in Polaris Bay, and the discovery of driftwood *(Larix* and *Abies Arctica)* on those shores, all go to prove the existence of a current from Behring's Straits northward toward Smith Sound. Moreover, the *Platycarya* drift-wood, which must come from Japan, could only be deposited on the shores of Robeson Channel by this route, for its absence in the Polynia, and on the north coast of the Tchukt peninsula, shows what direction it takes, when once within the Arctic Ocean. The stream which conveys this drift-wood is a branch of the warm Kurosiwo, and in spring and summer it flows northward, washing the east coast of Wrangell Land, and clearing it of ice, a fact which Captain Raynor in the *Pacific Commercial Advertiser* of the 9th of November, 1867, and Captain Long, in his account of his travels, draw attention to. It is the same warm stream which, with an E.S.E. wind, raises the winter temperature at Nishne Kolymsk, and which lends fertility to the vegetation in Kotzebue Sound and Chamisso island, the Asiatic side being bleak and dreary in the extreme.

Dr. Chavanne cites numerous instances in which the Arctic Sea between Spitzbergen and Behring's Straits has been found to be not only practicable for navigation, but even quite free from ice, and concludes by laying down the following general conclusions, which he draws from the above arguments:—

1.—The major axis of the Arctic continent (which is probably broken up by narrow straits or fiords) lies across the North Pole; Greenland, too, does not come to an end north of Shannon Island, and trend away to the north-west, but runs northward as far as 83° or 84° N. latitude, and thence extends in a north-east or north-north-easterly direction.

2.—The eastern coast of this mass of Arctic land will be found to lie somewhere between 25° and 170° E. longitude, in 84° and 85° N. latitude; and the west coast between 90° and 170° W. longitude, and 86° and 80° of N. latitude.

3.—Robeson Channel, which suddenly widens out north of 82° 16′ N. latitude, trends round to the west in 84° N. latitude, and thus leaves Smith Sound in direct communication with Behring's Straits. Grinnell Land is an island probably extending as far as 95° W. longitude, while Parry Islands to the south occupy the sea west of Jones Sound.

4.—The sea between the coast of the Arctic continent and the north coast of America is traversed by a branch of the warm Kurosiwo stream, which flows through Behring's Straits, and is thus occasionally free from ice, the warm stream flowing over as far as Smith Sound.

5.—The northern arm of the Gulf Stream which flows between Bear Island and Novaya Zemlya touches the northern coast of Asia, and, eastward of the New Siberia Islands, joins the western drift of the Kurosiwo. The other northern arm or branch of the Gulf Stream, which flows past the western coast of Spitzbergen and the Seven Islands, is submerged for a time beneath the Polar current, to reappear at the surface further northward, and thence lave the shores of the Arctic continent, which thus is washed by two warm streams, rendering the existence of perennial ice a sheer impossibility.

6.—The average altitude of the Polar Land above the level of the sea diminishes as it approaches the North Pole.

7.—The sea between Spitzbergen and Novaya Zemlya, as far as Behring's Straits, is even in winter partly free from ice, and admits of navigation in summer and autumn.

8.—The most promising route to the North Pole is, firstly, between Spitzbergen and Novaya Zemlya; and, secondly, by the sea north of Behring's Straits, along the coast of the unknown Polar Land.

TEMPERATURE OF THE WINDS.

Table showing Deviations from Mean Temperature.

WINTER.

	Mean Temp.	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm.	Maximum.	Minimum.	Diff.
Ice Fiord	—12.9	—3.3	—2.6	+1.1	+4.6	+8.8	+8.8	+8.3	+0.1	—3.9	SSW. +8.8	N. —3.3	12°.1
Bear Island	—13.2	—1.2	—1.8	—0.4	+3.8	+5.8	+7.6	+4.7	+0.3	+0.8	S. 25 W. +8.0	N. 20 E. —2.0	10.0
Tobiesen's Winter Quarters in Novaya Zemlya	—23.3	—4.5	—5.8	—3.4	+2.6	+3.7	+7.2	+6.5	+0.9	—5.4	S. 50 W. +8.9	NE. —5.8	14.7
Yakutsk	—38.2	—0.2	+3.2	+5.0	+3.3	+4.2	+4.0	+7.6	+3.0	—1.4	W. —7.6	N. —0.2	7.8
Nishne Kolymsk	—31.0	+1.3	+0.9	+4.7	+6.3	+5.0	+1.6	+2.0	+0.2	—3.0	E. 56 S. +6.5	W. 46 N. —0.1	6.6
Port Kennedy	—37.0	—0.2	+0.9	+1.6	+2.1	+3.2	+2.7	+0.3	—0.6	—2.5	E. 70 S. +3.5	W. 58 N. —0.8	4.3
Rensselaer Harbour	—35.0	+1.7	+1.4	+2.5	+2.6	+1.0	—0.4	+0.2	+0.9	—4.2	E. 50 S. +2.8	S. 60 W. —0.6	3.4
Godthaab	—10.0	—1.8	—2.4	—1.6	+2.3	+5.2	+3.5	0.0	—1.5	—	S. +5.2	NE. —2.4	7.6
Reikiavig	— 1.8	—3.6	—2.2	+1.3	+4.1	+3.7	+1.1	—1.4	—2.9	—	E. 68 S. +4.4	N. —3.6	8.0

SUMMER.

Bear Island	4.8	+0.2	—0.3	+0.4	+1.0	+1.3	+0.9	+0.2	+0.1	—	E. 75 S. +1.5	N. 50 E. —0.4	1°.9
Yakutsk	14.9	—1.4	+0.2	+0.8	+1.3	+1.5	+0.6	—1.1	—2.0	—	S. +1.5	NW. —2.0	3.5
Nishne Kolymsk	10.6	—0.3	+0.6	+0.2	0.0	+0.7	+1.4	—0.2	—0.8	—	SW. +1.4	W. 30 N. —1.0	2.4
Port Kennedy	3.1	—0.1	+0.1	+0.2	+0.5	+0.9	+0.3	—0.4	—1.0	—	S. 10 W. +1.3	W. 30 N. —1.3	2.6
Renssalaer Harbour	0.7	—0.3	—1.6	—0.9	—0.2	+0.1	+0.4	—1.0	—0.4	+1.2	S. 48 W. +0.6	N. 60 E. —1.7	2.3
Godthaab	4.8	+0.1	+0.3	0.0	+0.4	+0.2	+1.1	—0.8	—2.1	—	S. 50 W. +1.4	W. 40 N. —2.5	3.9
Reikiavig	11.0	0.0	+0.5	+0.1	+0.2	+0.3	—0.7	—1.0	—1.3	—	E. 30 S. +0.7	W. 35 N. —1.6	2.3

Bibliography.

—:o:—

HISTORY OF GEOGRAPHY.

SIEBERT (Dr. W.) die geographischen Entdeckungen u. Kolonisationen in unserem Jahrhundert u. unsere jetzige kenntniss der Erdsberflaecha. Vorlesung. 8vo., pp. 54. Kassel, 1874. 1s.

GRAVIER (G.) Découverte de l'Amérique par les Normands au Xe siècle. 8vo., pp. 290. Maps. Paris, 1874.

HARRISSE (H.) Les Colombo de France et d'Italie, fameux marins du XVe siècle, 1461-1492, d'après des documents nouveaux ou inédits tirés des archives de Milan, de Paris, et de Venise. 4to., pp. 140. Paris, 1874.

VARNHAGEN (F. A.) Ainda Amerige Vespucci: novos estudios e achegas. fol. pp. 8. Plate. Vienna, 1874. 4s. 6d.

HANDBOOKS.

CAPORALI (E.) Geografia enciclopedica rispondente al bisogno degl' italiani. 8vo., pp. 468. Milan, 1874.

REYT (M.) La géographie enseignée par le dessin, nouvelle méthode. 4to., pp. 396. Bordeaux, 1874.

UNGARELLI (L.) Corso elementare di geografia e statistica. Vol. I. 16mo., pp. 356. Bologna, 1874. 2s. 6d.)

SURVEYING AND PRODUCTION OF MAPS.

ESMONNOT (E.) Guide pratique pour les opérations de levé des plans (batiments—machines—topographie). Nivellement, lecture et détermination des courbes horizontales, &c. 8vo., pp. 199. Monlins, 1874. 2s.

SMITH, (R. S., U.S. Naval Academy, Annapolis) Manual of topographical drawing. Illustr. New ed. N. York, 1874. 10s.

CLEVENGER (Sh. V.) A treatise on the method of Government Surveying as prescribed by the United States Congress and Commissioner of the General Land Office, with instructions for the use of United States surveyors. 18mo., pp. 210. New York, 1874. 12s. 6d.

WACHTER (A.) Atlas élémentaire de topographie, précédé d'un vocabulaire topographique. 4to., pp. 16, and 40 plates. Paris, 1874.

BAUERNFEIND (C. M. von.) Besbachtungen und Untersuchungen über die Eigenschften. u. d. Verwerthung der Naudet'schen. Aneroïdbarometer. 4to., pp. 56. Munich, 1874. 2s. 3d.

PHYSICAL GEOGRAPHY.

DARWIN (Ch.) The structure and distribution of coral reefs. 2nd ed. revised. 8vo., pp. 290. London, 1874. 7s. 6d.

GIRARD (Jules) Les explorations sous-marines. Hydrographie, appareils de sondage, le sol sous-marin, la vie dans les profondeurs de la mer, les eaux, les mers anciennes. 8vo., pp. 256. Illustrated. Paris, 1874. 4s.

MELDRUM, Notes sur la forme les cyclones dans l'ocean indien, &c. 8vo., pp. 30. Maps. Paris, 1874. 1s. 3d.

ADHÉMAR (J.) Révolutions de la Mer. Déluges périodiques. 3rd ed. 8vo., pp. 366. Plates. Paris, 1874.

SCHLEIDEN (Dr. H.) Das Meer. 2nd ed. 28 steel plates, 300 woodcuts and map. pp. 752. Berlin, 1874. 34s.

ERMAN (A.) u. PETERSEN (H.) Die Grundlagen der Gaussischen Theorie u. d. Erscheinungen des Erdmagnetismus im f. 1829. 4to. pp. 44. Maps and Plates. Berlin, 1874. 6s.

SCHILLING (Capt. Baron N.) Die beständigen Strömungen in der Luft u. im Meere. 8vo., pp. 56. Berlin, 1874. 2s. 3d.

WORLD.

HÜBNER (A. von). Ein Spaziergang um die Welt. 2 vols. 8vo., pp. 830. Leipzig, 1874. 12s.

HÜBNER (A. di). Passeggiato intorno al mondo nel 1871. Turin, 1871.

BEHM (E.) and WAGNER (H.) Die Bevölkerung der Erde. Jährliche Uebersicht über neue Arealberechnungen, Zäplungen u. s. w. (Supplement, No. 35 of "Petermann's Mittheilungen".) Maps. 4to., pp. 110. Gotha, 1874. 5s.

EYRIES et JACOBS (A.) Voyage en Asie et en France, d'après les récits des derniers voyageurs. 8vo., pp. 700. Paris, 1874.

EUROPE.

COOK'S Tourist Handbook for Holland, Belgium, and the Rhine. 12mo., pp. 188. London, 1874. 2s. 6d.

OSBORNE (C. I.) A few pages from Real Life; or, a Guide Book from Notes of Impressions received from well-known places (Vienna, Constantinople, Athens, Rome, &c.). 2 vols. 8vo. London, 1874. 16s.

A SATCHELL GUIDE for the Vacation Tourist in Europe: a compact Itinerary of the British Isles, Belgium and Holland, Germany and the Rhine, Switzerland, France, Austria, and Italy. Maps. 12mo., pp. 360. London, 1874. 9s.

JANKE (Lieut. A.) Reise-Erinnerungen aus Italien, Griechenland u. d. Orient. 8vo., pp. 528. Berlin, 1874. 7s. 3d.

BRITISH ISLANDS.

MURRAY'S Handbook to the Cathedrals of England. Western Division (Gloucester, Hereford, Worcester, Bristol, Lichfield). New ed., pp. 346. London, 1874. 16s.

MURRAY'S Handbook for Travellers in Derbyshire, Nottinghamshire, Leicestershire, and Staffordshire. 2nd ed., pp. 266. London, 1874. 9s.

HANDBOOK and Appendix of all the Stations, Junctions, Sidings, &c., of the Railways in the United Kingdom; showing their exact position. New ed., 8vo. London, 1874. 3s.

SOME TIME IN IRELAND; a Recollection. 8vo., pp. 316. London, 1874. 7s. 6d.

SYMONS (G. J.) British Rainfall, 1873, at 1700 stations. Maps. 8vo., pp. 198. London, 1874. 5s.

FRANCE.

JOANNE (A.) Géographie du département de l'Aube. Map and illustration. 12mo., pp. 58. Paris, 1874. 9d.

JOANNE (A.) Géographie du département de la Loire. Map and illustrations. 12mo., pp. 66. Paris, 1874. 9d.

JOANNE (A.) Géographie du département de Seine-et-Oise. Map and Illustrations. 12mo., pp. 63. Paris, 1874. 9d.

TABLEAU général du commerce de la France avec ses colonies et les puissances étrangères, 1872. 4to., pp. 790. Paris, 1874.

LES nouveaux forts de Paris (loi du 27 Mars 1874), avec une carte par Erhard. 8vo., pp. 351. Paris, 1874.

ITALY.

MURRAY'S Handbook for Travellers in Northern Italy. 13th ed. Maps and Plans. 12mo., pp. 608. London, 1874. 10s.

ALTAVILLA (Prof. R.) Il Regno d'Italia. Dizionario geografico-storico-statistico ad uso di tutti. Turin, 1874. To be completed in 15 parts at 10d.

BUODO (P.) Estuario veneto. Fiume Po. Tre articoli. 8vo., pp. 32. Padua, 1874.

CALENDARIO generale del regno d'Italia, compilato per cura del Ministero dell' Interno. Anno XII. 8vo., pp. 1464. Rome, 1874.

Cartography.

—:o:—

British Admiralty Charts.

THE number of Admiralty Charts published since the 1st of January is exceedingly small, and only few amongst them are distinguished by originality. The so-called Track Chart of the World* is, in fact, a Mercator's Chart of the world, with the interior of the continents fully delineated, and intended to be used for laying down the tracks of exploring vessels or other information. It is very neatly engraved; but we should have preferred it if the hills had been omitted altogether or engraved in a less obtrusive manner, for, as they are, they merely obscure the outline without conveying an adequate idea of the configuration of the ground. The indication of the principal mountain summits would have met every practical requirement. The chart of a portion of the East Coast of England† is based upon surveys made by Captain Hewett, in 1828, and, as far as the Wash is concerned, by Captain E. K. Calver and Lieutenants J. H. Ellis, G. A. Browning, and F. W. Jarrad, in 1871. The delay in the publication of this survey is much to be regretted, for it may easily be imagined that intricate

* 2558.—Track Chart of the World. London, 1874. 6s.

† 1455.—England, East Coast, sheet 4, from Cromer to Trusthorpe. Scale 1 : 36,500. London, 1874. 1s. 6d.

channels and sand banks, such as are shown in this chart, are subject to change almost from year to year. The chart of Lough Carlingford* is a mere reproduction of Captain R. Hoskyn's survey (1857), with a few additions of no great importance to the general public, though not to be discarded by the mariner. The chart of a portion of the coast of Sweden† is based upon Swedish surveys, whilst that of Bavatoube or Dalrymple Bay (Madagascar)‡ is of French origin. The chart of the island of Amsterdam,§ in the Southern Indian Ocean, is based upon d'Entreceastaux's running survey (1792), supplemented by surveys made by order of Commander J. G. Goodenough in 1873. The island, according to the chart before us, has an area of about 17 square miles, and rises to an altitude of 2760 feet. The landing place near its north-eastern cape lies in latitude 37° 49′ S. and longitude 77° 33′ E. A supplementary chart, on a smaller scale, shows the relative positions of Amsterdam and St. Paul. The chart of the Gulf of Martaban‖ is based upon various surveys by British naval officers, whilst for that of Quiquik Bay and adjacent coasts¶ we are indebted to French surveys made in 1864. Australasia is represented by a chart of Port Lincoln,** from surveys made in 1872, by Staff-Commander F. Howard, and by a fine chart of the Akaroa Harbour of the Middle Island of New Zealand,†† surveyed as long ago as 1849-50, by Captain J. L. Stoker, Commander Richards and others. This delay in the publication of surveys is certainly much to be regretted, and we should think that if it arises merely from a desire of keeping within annual estimates, and not from a deficiency of engravers, it might easily be avoided.

Lastly, we have to notice the publication of four index charts‡‡ which facilitate reference to the publications of the Admiralty, and very usefully supplement the published catalogues.

Dutch Physical Atlas.

MR. N. W. POSTHUMUS, the Secretary to the Netherlands Geographical Society, and Dr. Kan of Utrecht, have published a school atlas of physical geography which is, in some respects, an improvement on those of Keith Johnston and Berghaus; while, by the use of the latest authorities, such as the results of the voyage of the 'Challenger,' and of Baron von Richthofen's travels in China, the work is brought up to date. The maps are well and judiciously drawn and coloured, to illustrate the earth's orography and hydrography, geology, the currents of the oceans, the winds, rainfall, distribution of plants and animals, ethnology, and religions. There are twenty-five maps, and the atlas is of convenient size, and admirably adapted for the purpose for which it is intended.

* 2800.—Ireland, East Coast:—Carlingford Lough with Newry River. Scale 1 : 104,300 and 20,860. London, 1874. 2s. 6d.

† 129.—Sweden:—Hönö to Paternosters, and approaches to Marstrand and Klädesholm. Scale 1 : 50,430. London, 1874. 1s. 6d.

‡ 707.—Madagascar:—Bavatoube or Dalrymplé Bay. Scale 1 : 28,100. London, 1874. 1s. 6d.

§ 1945.—Indian Ocean: Amsterdam and St. Paul Islands. Scale 1 : 72,800 and 505,000. London, 1874. 1s.

‖ 823.—Bay of Bengal, East Coast:—Coronge Island to White Point, including the Gulf of Martaban. Scale 1 : 365,183. London, 1874. 3s.

¶ 1005.—Cochin China, East Coast:—Quiquik Bay and adjacent coasts. Scale 1 : 9,360. London, 1874. 1s. 6d.

** 784.—South Australia:—Port Lincoln, Spencer Gulf. Scale 1 : 36,500. London, 1874. 2s.

†† 1575.—New Zealand:—Akaroa Harbour, Middle Island. Scale 1 : 29,200. London, 1874. 1s. 6d.

‡‡ *(a.)* Index sheet for General Charts of the World. London, 1874. 6d.
(b.) Index sheet for England, Ireland and Channel Islands. London, 1874. 6d.
(c.) Index sheet for Scotland, &c. London, 1874. 6d.
(k.) Index sheet for South America. London, 1874. 6d.

Log Book.

—:o:—

Henry Grinnell.—The first President of the American Geographical Society died at New York on the 30th of last June, at the advanced age of 75. Mr. Grinnell fitted out the first American Arctic Expedition in 1850, which co-operated with the English naval searchers after Sir John Franklin. This munificent act of sympathy with England was very warmly appreciated in this country, and the name of Grinnell has an honoured place in the memory of all English Arctic officers. Mr. Grinnell was for thirty years a member of the whale-ship firm of Grinnell, Minturn, and Co. It was one of his whalers which picked up the abandoned 'Resolute,' and Mr. Grinnell absolutely refused to accept his lawful share of the salvage. He always took a most lively interest in Arctic discovery, and one of the last occasions on which he attended a meeting of the American Geographical Society, was when the officers of the 'Polaris' were welcomed home.

Indian Marine Surveys.—Captain A. D. Taylor (late I. N.) will be the new Superintendent of Marine Surveys in India, to carry out the measures explained in the article in our last number; which have now received the sanction of the Secretary of State. Captain Taylor has come to England, in order to collect all existing materials that are likely to be useful in the execution of his work; and he will return to Calcutta in the course of the autumn, when it is hoped that the long neglected surveys of our Indian coasts will at length be resumed.

Travels of Mr. Cross in South America.—Mr. Robert Cross, the traveller who was employed by Mr. Markham on several occasions to collect chinchona seeds in Ecuador and New Granada, has returned from a fifth visit to South America; and intends to publish the results of his wanderings. His first trip was from the coast on the south side of the bay of Guayaquil, where he examined several ancient burial mounds, to the cordilleras of the province of Loxa. In the forests he discovered extensive ruins, consisting of stone walls and causeways scattered over the mountains for a space of 30 miles.

Mr. Cross afterwards landed at Buenaventura, the Pacific port of New Granada and, crossing the Cauca Valley, reached that of the Magdalena. He passed some time among the Paez Indians, near the headwaters of the Magdalena, an interesting aboriginal race of whom very little is known.

Direct Line of Steamers from Liverpool up the Amazon.—Last April the steamer 'Mallard' arrived at Manaos, on the Rio Negro, several hundred miles above the mouth of the Amazon. She left Liverpool on the 22nd of last March, and touched at Havre, Vigo, Lisbon, and Pará, leaving the latter place to ascend the river on the 24th of April. The people of Manaos joyfully welcomed this commencement of direct communication with their inland province from the other side of the Atlantic.

The Paraguay Survey.—Owing to a change in the administration, and to the general inefficiency of the executive, the scientific expedition to Paraguay has been broken up, and most of its members have

returned. But Mr. Keith Johnston was too good a geographer to give up his aspirations after one disappointment. Resolved to achieve some useful work, he has joined the Argentine General, Vidal, who is exploring the Gran Chacu in the direction of Bolivia, with the object of settling the boundary question. We are confident that the young explorer—the bearer of a name so highly honoured among geographers—will not return without doing good service to a science, devotion to which is a tradition of his family.

New Granada.—The report of Señor Parra, the Secretary of the Interior at Bogota, for 1873, shows the revenue of the Republic of New Granada to amount to 800,000*l.*, of which sum 550,000*l.* are derived from customs. The value of the imports was 2,500,000*l.*, and of the exports 2,192,000*l.* The number of vessels which entered the ports of New Granada was 1010, measuring 361,156 tons, of which 281 were steamers. The coinage of gold and silver amounted to $533,671. Señor Parra refers to the introduction of chinchona cultivation into India as an example which the Neo-Granadinos should follow, with regard to many products of the old world which might be profitably cultivated in the valleys of the Magdalena and the Cauca.

Affairs on the Northern Frontier of Persia.—From Asterabad we learn that the Turkmen have of late shown themselves more amenable to the Persian authorities at that city, and have paid tribute without opposition, but that between the tribes themselves there have been bitter intestine quarrels, which recently culminated in a bloody inter-tribal conflict. In February last about 2000 families of the Goklan Turkmen, who had originally emigrated from the Khanate of Khiva, to avoid having to contribute to the Russian war indemnity, had come to settle in Karikala, a group of old dismantled forts on the Atrek. They had, however, been requested to retire within their old haunts between the Gurgan and Atrek, by the Governor of Bujnurd, who felt uneasy at their proximity, and there was every probability of their obeying quietly.

A rumour is gaining ground in Tehran that the Teke Turkmen intend invading Khorassan, and advancing against Khelat. The Persian Government has accordingly commenced operations for an expedition against them, and is considering a project for establishing a telegraphic line along the frontier, as far as Meshed, and so keeping a vigilant eye on the movements of the Turkmen.

Père David on the Population of China.—The well-known French Missionary in China, Père David, has made some interesting communications to the Paris Geographical Society on the subject of the population of China, which has been so much discussed. The Muhammadan rebellion has occasioned such ravages that, whether from wholesale massacre or from emigration, some provinces of Central China are actually reduced to a fifth of their previous population. But, nevertheless, Père David cannot agree with Baron Richthofen, who estimates the total population at no more than a hundred millions. A hut, which in Europe would only do to house a horse, a cow and her calf, serves in China to lodge several families, forming an aggregate of say from thirty to forty people. A better estimate can be formed by calculating the number of hamlets and villages to a *ton* or parish, the number of *tons* in a district or *chiene*, the number of *chienes* in a division or "riding" (called *fou*), and the number of *fous* in a province or *sen*, than by any calculation based on the superficial area. In Kiangsi, which Père David is acquainted with, and which he thinks may fairly be taken as an average province, the above calculation based on a postulate of four souls to a family, would give a total of 17,380,000 human beings. This would give for the eighteen provinces of China a population exceeding 300,000,000. It is certainly a fact that Chinese towns are often extremely scantily populated, but on the other hand the mountains are most densely inhabited. The Chinese marry young, and were it not for infanticide, occasional desertions, and the ravages of small-pox, the population would, doubtless, double itself in a score of years.

German Expedition for Observing the Transit of Venus.—The German corvette 'Gazelle,' Captain von Schleinitz, left Kiel on June 20th, with the members of one of the parties for observing the transit of Venus. The 'Gazelle' will first of all proceed to the Cape of Good Hope, following a track intermediate between that of the 'Challenger' and the coast of Africa. Having regulated the instruments at the Cape Observatory, it will visit the Crozet Islands, and then land the astronomical party on Kerguelen. Should the weather render astronomical observations impossible, it will take the astronomers at once to Mauritius, whence they will return to Europe. In the more favourable case, however, it will leave the astronomers for awhile to search for the warm current supposed to exist between longitude 68° and 80° E., and make an effort to reach Wilkes' Land. On returning to Kerguelen the astronomers will be taken to Mauritius, but the 'Gazelle' will visit the north-western coast of Australia, the coast of Guinea, and several inland groups of the Pacific, finally returning to Europe through Maghelaos Strait. The 'Gazelle' has been supplied with a complete set of instruments for deep-sea soundings and physical observations, and results of importance to science may be anticipated, even should the observation of the transit of Venus be rendered impossible. Germany will likewise despatch astronomical expeditions to Auckland, Chifu (China), Mauritius and Ispahan.

A New Sea-port for Rome.—Prince Torlonia has ceded a large tract of territory at Fiumicino and along the right arm of the Tiber for the purpose of creating a new sea-port, to be connected with Rome by a railway. Fiumicino is about 2 miles below Porto, the ancient Port of Trajan, and is intended to become with reference to modern Rome what Ostia, and at a subsequent period Portus, were to the ancient city. The skill of modern engineers is believed to be equal to re-opening the silted up mouths of the Tiber to the navies of the world.

A German Nautical Observatory (Seewarte).—A Bill has been prepared by the German Federal Council for the establishment of this institution at Hamburg. The observatory will be charged with the collection and publication of information concerning the geography of the sea, with making meteorological and astronomical observations, and the hoisting of storm-signals. Branch offices are to be established at the principal German sea-ports.

Correspondence.

———:o:———

KARA-KORUM.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In your last number (p. 167) Colonel Yule has attracted attention to a passage in my paper No. III. (*Geographical Magazine*, June, p. 113), in which, on the authority of D'Ohsson, I stated that Kara-Korum "by Muhammadan writers was called Ordu-Balik *or Belasagun*." When I quote from Veniukof or from any one else, I usually say so. The matter on Kara-Korum, as is evident in my paper, is an interpolation from Paderin himself, and I may as well observe here that my papers are not so much digests as reviews of Veniukof's work, and rather essays than either the one or the other, for I bring to bear upon him a mass of outside materials from various authorities who are in all cases alluded to by name.

With reference to the question suggested by my remark on Kara-Korum, I would point out that I distinctly name D'Ohsson (not D'Hosson, which was a misspelling) as the authority for my statement; the ambiguity is therefore not in my writing. Having given this explanation, I now proceed to admit that I was wrong in adding "or Belasagun," and that Colonel Yule, who is as much master of the geography of Asia as I am comparatively but a student in it, is perfectly correct in his doubts.

My error arose from quoting D'Ohsson at second-hand, and from adhering too faithfully to M. *de* Semënof, whom I mentioned by name in a line with the quotation. I had not D'Ohsson by me at the time, so that I could not verify either the reference or the fact as given by my Russian authority. Hence not alone my application to Kara-Korum of the alternative name of Belasagun,* but also the reference to the wrong page in D'Ohsson's work. Colonel Yule's surmise that Ritter is responsible for that application, is so far apparently correct, for as M. *de* Semënof himself gives the wrong page in D'Ohsson, and fathers upon the latter, as we shall see, a statement which is directly the reverse of what the latter does say, it is to be concluded that he, also, did not turn to D'Ohsson, and quoted him through Ritter.

The phrase as it occurs in M. *de* Semënof's Russian edition (vol. ii., pp. 264 to 265) of part of Ritter's Asia, is as follows:—

"Muhammadan writers call this ancient capital of the Turks [Korin or Kholin, or Kara-Korum] Ordu-Balig [*D'Ohsson Hist. des Mongols*, t. i., p. 76] or Belasagun [Balgassun], which is, however, only its title."†

I cannot at present refer to Remusat's *Recherches sur la ville de Kara-Korum* to see if this is borne out by that writer, but D'Ohsson in his note v. to p. iii. (not 76), see vol. i., p. 430, says, "Les Ouïgours croyent que leur nation habitait primitivement les bords du fleuve Orcoun [Orkhon], qui prend sa source dans les monts appelés Caracouroum, dont le nom a été donné à la ville récemment fondée par le Caan [Ogotaï]." . . . . "Les Ouïgours établis sur les rives de l'Orcoun se divisèrent en deux nations, ... ils s'élurent un chef. Ce fut cinq cents ans après cette époque que parut Boucoukhan. On dit que ce prince est le même que celui qu'on nomme Efrassiyab. Il y a dans les monts Caracouroum une ancienne fosse qu'on dit être la fosse de Pijen, et l'on voit sur le bord de l'Orcoun les vestiges d'une ville et d'un palais, qui étaient jadis nommés Ordou-Balic, et qu'on appelle maintenant Maou-Balic."

Ordou-Balic, D'Ohsson explains, means the city of the Ordou* and Maou-Balic means bad city, or ruined city.

In the same note in D'Ohsson, it is said that the legendary "Boucoukhan" of miraculous birth (as described in an inscription on a stone tablet found in a pit in front of the palace above-mentioned, and which was taken to China and deciphered there, p. 431), built the city of Ordou-Balic on the banks of the "Orcoun," on the return from the west of his victorious armies with their numerous captives (p. 433).

As for Belasagun, I now find that D'Ohsson does not confound it, as M. *de* Semënof would have it, with Ordou-Balic, for on p. 433 D'Ohsson, quoting Muhammadan writers, says, Boucoukhan "marcha vers l'occident . . . . arrivé dans le Turkustan, il vit un belle plaine, bien arrosée, offrant de gras pâturages; il y établit sa résidence et y bâtit la ville de Béla-Sagoun,† qu'on appelle maintenant Gou-Balic. . . . Après avoir terminé ses grandes entreprises, Boucoukhan quitta sa résidence [Béla-Sagoun] pour retourner dans son pays natal."

D'Ohsson's note is composed of extracts from the "Tarikh Djihankuschaï," and from the "Djamiut-Tévarikh." I very much regret having been misled by the eminent Russian geographer; at the same time it is, perhaps, fortunate that I have, albeit unconsciously, led to the discovery of a geographical error in a Russian work of undoubted merit.

In his work on Mongolia (1828) Father Hyacinth says (note pp. 142 and 143) that Djynli-Khan, the chief of the Hoi-Hors (Ouigurs), A.D. 759 to 780, built the city called Khara-Khorin,‡ and Kara-Korum by the Turks, which Chingiz afterwards made his capital; Ugedei (Oktai) raised a wall round his capital, Khara-Khorin (p. 180). In 1369 (*sic.* in Hyacinth; Timkofski has it 1370) Ayur-Shiri-dara, son of Togan-Timur of the house of Tatan, removed his court from Dala (ai) Nor to Khorin (Part II., p. 195). On the map attached to this volume the site of Kara-Korum is not indicated, but on that attached to Hyacinth's *History of the Lives of the First Four Khans of the House of Chingiz*, the city is marked exactly where Colonel Yule would now have it,

* Colonel Yule at the end of his first note, p. 137 of your July number, notwithstanding his objection to this, would seem, from his wording, to give it the colour of his sanction.

† M. *de* Semënof devotes several pages to Kara-Korum, referring I believe to every existing authority on the point. Whether Paderin quotes "Chjan-de-Khoi," and others from the Russian translations or merely through M. *de* Semënof, I cannot say. The Siberian source, I may observe, is not easily, if at all, accessible in Europe.

* There is a note in D'Ohsson (vol. i., p. 83), explaining the meaning of Ordou, &c., which is evidently a transcript from Father Hyacinth, whose many learned remarks and elucidations seem to have passed, chiefly I should say, through Klaproth, into all subsequent works on Eastern Asia. Yet Klaproth, in more than one place, talks of the Father's ignorance and inaccuracies.

† Béla, or Bala, according to Father Hyacinth's list of historical names, taken from the Chinese dictionary of improved nomenclature, is a man's name, and means "to guard" (Sanscrit). Ba-la (Chinese). Béla or Bala-Sagun, Balgasun or Balgasu is, I find, a very common addition to names of places in Mongolia. Thus Father Hyacinth, quoting from "Han-mu," says, "The Mongol sovereign was then [at the time of the capture of Pekin by his cavalry] at Huan-Cheù," which, he explains on pages 76 and 80, is now known as Khurtun-*Balgasu* (*History of the First Four Khans of the House of Chingiz*, p. 80, in Russian). This is only one of many examples, and there is a Kara Balgasun in the pass between Urumtsi and Khamil.

‡ Khorin (Mongol), Kho'in (Chinese), means twenty. Kara corrupted into Khara by the Chinese, means black, as everybody may know; but there were neighbouring tribes north of the "country of the three rivers" called the Khéré, and as Kara-Korum is also called Kéré-Kherin (*vide* Paderin), the name of that place and of the mountains may have been derived from the Khérés. This will accord with the system of nomenclature which prevails still among the tribes.

and as he has located it on his sketch map in your July number; but Father Hyacinth on this map calls it Dalalakhu-Khaia-Balgasu. This same name has been transferred to Petermann's little map of Western Mongolia (see *Mittheilungen*).

M. *de* Semënof, referring to Timkofski,* says that the situation of Kara-Korum, as indicated by the latter, and as shown on the *Carte du grand desert et des pays voisins, &c., Recherches*, "corresponds with the location of the place, unknown to us, however, called Talarkhé-Kara-Balgasun, 47° 32′ 24″ N. lat., and 13° 21′ 30″ W. long. of Peking, *i.e.* 100° 40′ 30″ E. long. of Paris, according to the determination of the Jesuits (Du Halde, ix., p. 615)."—*De* Semënof, vol. ii., pp. 200 and 201.

Balgasun applied to Kara-Korum must then have come from Father Hyacinth, who translated direct from Chinese histories, and not, as Colonel Yule presumes, from Ritter, who followed later.

In conclusion, I would suggest that Pijan, near Turfan, which is, too, situated near a lake, may be the ancient Balga-sun (*Balga* meaning "guarded refuge," and *Sun* being, perhaps, an objective case, and derived from *Su*, water), and that we may not unjustifiably connect the fable of the young Persian prince Pijen (*vide* D'Ohsson, p. 430, and note) with this place in Eastern Turkistan, to which "Boucoukhan's" Persian captives were brought, and from which he soon afterwards removed to his native country.

I would take this opportunity of correcting some misprints which occurred in my paper No. III., inserted in your June number. Read Raguzinski for Raguzinskia; on page 112, 1st column, line 15, read *from* Verkhné-Udinsk instead of *to*, and in line 16, read *to* instead of *on* the Kerulun; finally, in the last line of the 1st column, p. 112, the figure 47 indicates the number of miles which Soin-Noin is supposed to be distant from Kara-Korum, and, of course, not of degrees, as it is made to appear. With reference to the footnote p. 112, I had overlooked the fact that Mr. Ney Elias's map had been published in *Ocean Highways* for June 1873. In my last paper, p. 165, column 2, line 10, I should have said "between the Taranchis and the *remaining* Tungans.—Yours, &c.

ROBERT MICHELL.

HANDBOOK FOR TRAVELLERS IN NORWAY.†

ALL readers travelling or sporting on the Continent are likely to have applied more than once to those red cloth bound "Bradshaw's" or "Murray's," in order to get a precise and succinct information about what was to be seen or met with on their route. To the series of these useful handbooks, published in England or Germany, a Norwegian editor, the Consul-General Charles Tönsberg, at Christiania, has lately added a very instructive and practical traveller's handbook for Norway *(Norge, Illustreret Reisehaandbog)*, whose alpine nature and picturesquely striking scenery are known to many of our readers we suppose. In directing their attention to this valuable publication, the text of which will be found to be as reliable and interesting as the wood-cuts and maps, we only wish to inform them that preparations have been made already for an edition of the book, adapted to English readers or travellers.

* Schott's edition.

† *Norge, Illustreret Reisehaandbog*. Udgivet af Chr. Tönsberg. Handbook for Travellers in Norway, with 112 Woodcuts and 17 Maps. Printed at Christiania, 1874. London: Trübner & Co., 57 & 59, Ludgate Hill.

Proceedings of Geographical Societies.

—:o:—

IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

AT the meeting of the 8th of May last, M. P. Semenof, Vice-President, being in the chair, the Secretary, M. Wilson, announced the departure of the Amu Daria Expedition under the command of Colonel Stoletof, and that the rival expedition charged with the duty of carrying a series of levels from the Caspian to the Aral had completed its preparations, and would commence work under the direction of Colonel Thilo, about the beginning of June. General Kaufmann had presented a valuable album of Khivan views and portraits, being a companion work to a similar one on Turkistan, which he had favoured the Society with about a year ago.

Letters had been received from M. Miklucho-Maklay, dated the 15th of February, from Amboina, and announcing his intention of repairing for the second time to New Guinea. He enclosed at the same time an essay in German on the Papuan language, and a pamphlet printed at Batavia, containing meteorological and other notes on New Guinea.

News had also been received from M. Chekanofsky, dated the 15th of February at Erbokhotchone, on the Lower Tunguska (North Siberia). Messrs. Chekanofsky and Muller had left Irkutsk on the 29th of last December, but for a month and a half had been occupied in making preparations for their journey to the Olenek River. During this interval, however, M. Muller had taken observations for latitude at several points along the Lower Tunguska. On the 16th of February, the travellers proposed to start for the sources of the Olenek, and to travel down the Tunguska as far as the confluence of the Great Tigliakit River (*circa* 60° N. latitude and 125° E. of Ferro); should, however, the snows prove too deep it might be necessary to go as far as the confluence of the Ukotcho or Kuakskugna tributaries, which do not appear on most maps. The petty merchants and Tunguses who frequent this region know the country well, and have been asked to lend their assistance to the expedition.

Many important results have been already achieved, but even after the Lower Tunguska and Olenek have been surveyed, a large tract of country within the Arctic circle and between the Lena and Yenisei will still remain unexplored. The courses of the Anabara and Khatanga Rivers, their distance from each other, the position of the estuary of the Yenisei (which varies as much as eight degrees on different maps!), and the position of lake Yesei, which is a place of resort for the Tunguses living on the Vilui, the Tunguska and the Yenisei, all require determination. The geological exploration of the banks of the Anabara and Khatanga, and of the bleak *tundras* between the Lena and Yenisei, would form an appropriate complement to the present labours on the Olenek and Tunguska, and Von Middendorf's work to the westward.

The above arguments have been strenuously urged by M. Schmidt (already known for his travels in the Lower Yenisei, see *Ocean Highways* for January, 1873, p. 324), and on his recommendation the Society has consented to prolong M. Chekanofsky's mission for another year, and granted him a sum of 3000 roubles for the purpose.

At its last meeting, the Council of the Society approved of Captain Prshevalsky's proposals with reference to the publication of his work on his recent travels in Mongolia.

It will be entitled *Mongolia and the Tangut Country*, and will appear in three volumes. The first will be devoted to a description of the geography of the country traversed, a sketch of the people, and a narrative of the journey, and will be illustrated by a route-map drawn by Prshevalsky on the scale of 40 versts to an inch. The second volume will be taken up with remarks on the climate and the fauna, and with meteorological, hypsometrical, magnetical, and astronomical observations, while the third volume is to contain the botanical portion. Both the latter volumes will have numerous engravings. Several well-known names are to be associated with that of Prshevalsky in the production of this work, to which end the Society has lent a sum of 10,000 roubles, and three or four years is assigned for its completion. The first volume is, however, expected to appear towards the end of this year.

The completion of M. Rittich's ethnographical map of Russia in Europe was announced, as well as the intention of M. Bachmakof to hasten its publication by advancing a sum of 2000 roubles to the Society.

The meeting concluded with an account of a most interesting journey made by M. Pachino. This gentleman left Europe in the spring of last year, with the intention of traversing Hindustan and returning through Russian Turkistan. Although he was unable to carry out his scheme, he was able to advance far into the north-west, among the independent tribes north of Kashmir. From Ghilgit, this plucky traveller, disguised as a Hindu, had penetrated to Yassin, Amalsa, and Darkot, where poor Mr. Hayward was so brutally murdered. At the latter place he was recognised by an Affghan, who had met him some years before in Turkistan, and he was accordingly subjected to searching investigation before the local authorities. His thorough knowledge of Oriental languages and manners enabled him, fortunately, to disarm suspicion. After returning to Ghilgit, M. Pachino visited Lahor, Shikarpur, and Haidarabad, before setting homewards. His narrative is pleasantly interspersed with incidents of travel, and observations on the manners and customs of the numerous peoples of India, and a detailed description of his travels will appear in an early number of the *Bulletin*.

———:o:———

FRENCH GEOGRAPHICAL SOCIETY.

Meeting of June the 17th, 1874.

THE Abbé DURAND, Assistant Secretary, read the minutes of the preceding meeting.

The Secretary of the Council, M. Ch. MAUNOIR gave a summary of the contents of the correspondence. M. N. Wyse had telegraphed from Tunis, that on the 11th of December last Dr. Nachtigal had written a letter from Wâra, reporting that the road towards Fûr was now open. M. Vivien de Saint-Martin had sent a note on the best road for Polar explorations.

The President of the Chamber of Commerce of Algiers informs the Society that M. Soleillet, having reached the oasis of In-Çâlah, has thereby shown the first halting-place for Algerian commerce in Central Africa, and that he had returned northwards with some inhabitants of Tuât. The Secretary of the Prefecture of Constantine announces that a sum of 2000 francs has been granted by the general Council of Constantine to M. Dournaux Dupéré, to defray the expense of his journey.

In the absence of the Abbé Armand David, M. Daubrée gave a summary of the last travels of the missionary, in some unknown portions of the interior of China. He began with the account of a hasty trip on the Tche-Kiang. M. David wanted to go to the Kokonoor for the prosecution of his studies in natural history. The Chinese ministers had refused his request for permission to visit the Shen-si province, then in the possession of the Muslims. His last journey lasted sixteen months and a half. He started from Peking for the province of Shen-si, and after travelling for thirty-two days, he reached the mountainous region, where he stayed five months and a half. Political reasons prevented him from going farther west. Abbé David continued his journey on the Han-Kiang, a tributary of the Yang-tze, 3860 *li* in length, where he was shipwrecked. The Han-Kiang, according to the observation of the zoologist-priest has a fall of 1 metre in every 6 kilometres. The second portion of the journey brought him into the provinces of Kiang-si and Fu-kian. Here he and his two servant-hunters suffered from ague, which delayed their further progress for a long time. He afterwards explored a cluster of mountains in a district very rich in natural productions, but again fell ill from ague and acute bronchitis.

Abbé David collected numerous geographical details. From Peking to the Se-tshuan, he travelled over an almost level plain. In the province of Shen-si he made very interesting geological observations on immense deposits of mud, and also on the important mountain range of Tsing-ling. He found carboniferous limestone in the mountains of Hang-Shan. He described the navigation on the Han-Kiang, and everywhere collected observations of the altitudes of places, and on their geology.

As to the population of the Chinese Empire, which Baron von Richthofen believes to be 100,000,000, the Abbé David thinks it is considerably above that number.

The Baron D'AVRIL communicated the news he had received from Colonel Gordon. A first letter, written in Khartoûm (15th of March), reported his arrival after a journey of eighteen days *viâ* Suez, Suakin, and Berber. It contains a description of the country and of the inhabitants. In another letter, dated the 17th of March, the Colonel speaks of the accumulation of vegetation on the Bahr-el-Zaráf, which formed the bars which stopped Sir Samuel Baker during eighteen months; and of the successful endeavours of the Egyptian Government, in cutting the bar. In consequence of that measure, an irruption of the waters followed, so violent, that hippopotami were carried away, and killed by contact with the steamers. The following letter, written on the road to Gondokoro (27th of March), contains a description of the animals living in the river. On reaching Gondokoro, Colonel Gordon wrote again (16th of April). He says that the navigation on the Bahr-el-Abiad had been very difficult, and would be very thankful to the French Geographical Society for aid by despatching a man who would explore the surrounding country. The difficulties of travelling have been exaggerated. He hopes to be in the Victoria Nyanza about October or November, and will proceed first to Mandara, a distance of twelve days' march.

M. H. DUVEYRIER read a note on the first portion of the journal of the French traveller, M. Dournaux Dupéré, from Tougourt to Ghadâmès, which he had received. He exhibited a sketch of that part of the route, which he had constructed according to the bearings and distances of M. Dournaux-Dupéré, on the scale of 1:400,000. M. Duveyrier expatiated upon the usefulness of the work and observations of M. Dournaux-Dupéré. In geography, he has already surveyed 130 kilometres of the lower part of the Igharghar, that large valley, formerly a river feeding the Bay of Triton, but which had remained dry for seventeen centuries. Now we know from M. Dournaux-Dupéré that an inundation took place some years ago. M. Duveyrier pointed out the great value of M. Dournaux-Dupéré's barometrical observations in those parts. He also read a letter from Dr. G. Schweinfurth, in which that traveller, before leaving Alexandria on his way home, gives an account of his work during his stay in the Libyan Desert.

Meeting of July 3rd, 1874.

THE Abbé DURAND, Assistant Secretary, read the minutes of the last meeting.

The General Secretary, M. CHARLES MAUNOIR, informed the meeting that a telegram from the Emperor of Brazil had been received by the Society, on the occasion of the opening of telegraphic intercourse between Brazil and Europe. He also announced that intelligence had been received, although without confirmation, of the deaths of MM. Dournaux-Dupéré and Joubert, in the Sahara.

The General Secretary then read the following extracts from a letter which he had received from Major Wilson:—

"You will be pleased to hear that the surveys of nearly one-half of Palestine are now complete, and that the map has been drawn on the scale of one inch to an English mile, that is to say 1:63,360th; and, finally, that we hope to bring the operations to their conclusion during the winter of 1875-76, at which time the publication will begin.

"MM. Ganneau and Lecomte are doing good work. At Jerusalem and the environs they have made new and interesting discoveries, of which you will certainly have seen an account in the quarterly reports, which I trust our Secretary sends regularly to you.

"We have to deplore the death of Mr. Drake, who died a few days ago from ague caught in the valley of the Jordan."

In addition to the correspondence of the Society, Dr. HAMY said that M. Mariette Bey had announced his discovery of Egyptian inscriptions relating to the reign of Toutmes III. These would contain about 1000 geographical names of places scattered over a considerable extent of country, beginning with Armenia on the east, extending to Nubia southwards, and including the whole of the basin of the Mediterranean, such as they were known to Egyptians during the seventeenth century before our era.

M. HERTZ announced that the Commission for Commercial Geography would have an exhibition in Paris, at the same time as the Geographical Congress. This exhibition will comprise: first, books and maps for the teaching of geography; second, books and maps on new commercial routes; third, samples of the natural productions of distant countries; and fourth, samples of French products which are exported to foreign countries.

M. FERDINAND DE LESSEPS said that at a meeting of the Society held about a year ago, he had spoken on the subject of the junction of Russian and Indian railways. A Frenchman, M. Cottard, and an Englishman, were appointed to explore the country, each beginning his journey at one of the two extremities of the projected line. M. Cottard has gone to Moscow, and has suggested the adoption of a line passing through Kazan to Tashkend. The line passing by Orenburg is the strategic route; that passing by Yekatarinburg and through Siberia is the commercial route. At the close of this year the project will be prosecuted in the latter direction. Although at first it had been proposed to go to Samarkand, M. de Lesseps' son points out Kashgar and Yarkand as the best main stations on a line uniting Russia with India. The Government of India has permitted M. de Lesseps, jun., to examine all Indian maps, published or unpublished. It is his intention to explore another road, passing along the valley of the Djihûn, and leaving Afghanistan to the south. At present the young traveller must be in Kashmir, on his way to Yarkand, the recently constituted state under Ya'qûb Beg. M. de Lesseps alluded to some slight difficulties raised by the English Government against the journey of observation of his son; but since he had declared his intention of passing through the valley of Kashmir, no further objections were raised. In illustration of these difficulties he pointed out that Mr. Shaw, an English functionary, had been obliged to start in secret in order to reach Yarkand.

Recently M. de Lesseps has submitted to the Academy of Sciences the project of M. Roudaire to create a sea in the interior of Algeria. A commission has been appointed by the Academy to consider the project, and is open to receive advice on the subject. Officers of the staff will be sent into the Tunisian Sahara to construct an exact map of that country. M. de Lesseps gave some particulars of the mode of excavation pursued. In illustration of the change of climate which would follow in the Algerian Sahara, he pointed out that since the month of November 1869, when the bitter lakes in the Isthmus of Suez were filled with water, the climate of the isthmus had changed, rain falling there now.

M. DELAHAYE, a companion of M. Dupuis during his journey in Tong-king now submitted, in his name, a map, drawn from memory, of his travels in 1870-73, showing the course of the Red River or the Songhoï, also called Hong-kiang. He said that for want of necessary instruments he could not claim for the map the merit of great accuracy. From Mangao to the mouth of the river Songhoï the distance is 414 miles, and can be travelled over in ten or fourteen days. Last year M. Dupuis navigated on the river with boats freighted with arms, destined for an attack on Ta-li-fu in Yün-nan, the expedition of M. Garnier arriving some time afterwards. M. Delahaye was himself present at the capture of Hanoï, and heard of the seizure of the other towns. He is now about to publish a narrative of those events.

M. ANTOINE D'ABBADIE presented a complete copy of his *Géódésie d'Ethiopie*, a large quarto volume containing many maps, and said a few words explanatory of his system of geodesy. He began his operations at Mussawwa', on the Red Sea, where he arrived, and in the neighbourhood of which a range of mountains extends parallel with the sea. Before leaving that place he measured the direction of the range by means of the difference of azimuths with the sun. When in 'Adwa, he observed its latitude, and obtained the distance of the range by means of the time necessary for the transmission of sound. In Diksa also he observed the latitude; but as it would have been dangerous at that time to fire guns in order to deduce the difference of longitude from the length of time necessary for the transmission of sound, he established triangles by taking aims on the points he had already fixed on the map. One mountain he found to be higher than Mont Blanc. He pushed on his chain of azimuths as far as lake Tana and Gôndar, the longitudes of which were unknown at that time, and which he obtained by triangulation, finding it more exact than by astronomical observations. Rüppell's position of Gondar is incorrect on account of the unevenness of the country on the road thither, which lengthens the route by retarding the march. M. d'Abbadie gave very instructive hints on the way he ascertained the identity of a particular point when standing on the various stations by the concordance of his measures on that point. He examined the agreement of the results of height of longitude and latitude derived from the observations made at all the stations. His geodesic survey extended from Mussawwa' to Kaffa, an extent of country measuring as far as from Normandie to Spanish Navarra.

M. A. d'Abbadie then gave some particulars as to his measurement of heights. He calculated the heights of places according to the temperature at boiling point. He spoke of his experiments and of his small bases measured with the gun, and said that with a cannon one could measure a base 100 kilometres in length. Such was the true base of his map extending from Diksa to Mount Soloda. In recommending his method of geodesy to French travellers, he said it was used for the first time by a French officer, between Corsica and France in the year 1838; and, in conclusion, alluded to one incident of his long and adventurous travels in Ethiopia. He

was stopped on the coast by the English, who wished to go before him into Inariya, and who afterwards denied that he had ever entered that country.

The President, M. DELESSE, on behalf of the Society, paid M. d'Abbadie a well-deserved meed of praise for his labours in Ethiopia, the geography of which he had now brought to a conclusion.

First General Meeting of the Committee of the International Congress for Geographical Science in Paris.

The several sections of the Committee of the International Geographical Congress to be held in Paris during the year 1875, assembled in the rooms of the Geographical Society, Rue Christine, on July 10th, 1874, for information respecting the progress of their preliminary labours. M. DELESSE, President of the Geographical Society, and of the Committee of Congress, was in the chair. In his address he explained the difficulties of the undertaking, and pointed out what had already been done, notwithstanding the work was but in its infancy.

Admiral DE LA RONCIERE LE NOURY, President of the Society, said that, after mature consideration, he thought the best place for the Congress to hold its session would be the new buildings of the Louvre, facing the banks of the Seine, and urged the necessity of fixing a date for the opening of the Congress. He proposed Easter Wednesday, the 31st of March, 1875, which date M. Delesse entirely approved.

M. HERTZ called attention to the project of the Economical Section of the Committee, which wishes to have, on the occasion of the Congress, an exhibition of commercial geography. He said that the new exhibition was not intended to compete with the Exhibition of the Productions of Algeria and the Colonies, to which last it would be afterwards annexed.

H. D.

——:o:——

HAMBURG GEOGRAPHICAL SOCIETY.

WE have received the *Annual Journal of the Hamburg Geographical Society*, a young body to whom we most heartily wish success. The Society was founded on the 6th of March, 1873, and at the end of the month numbered 228 members, Dr. Kirchenpauer being President. There are not many men of purely scientific tastes in Hamburg, the great commercial city of Germany, but as geography is so intimately connected with trade and navigation, a Society having for one of its objects the diffusion of knowledge on that head, was sure to receive support and encouragement. The merchants of Hamburg and Altona have dealings with all parts of the world, and many of them have made arrangements for obtaining all available information of a geographical and scientific character from their numerous agents abroad. An instance of the way in which trade and exploration assist each other is afforded by the case of Dr. Lenz (to whom we have already alluded in our July number, p. 175), who will very shortly sail for the Ogowai, and explore that interesting and little known volcanic region east of the Gaboon. He will make as his base of operations the factory of Herr Woermann, a Hamburg merchant on the Gaboon. After completing his researches, Dr. Lenz will endeavour to effect a junction with the German African Expedition under Güssfeldt.

The Hamburg Society's meetings during the year under review (April 1873, to March 1874) were monthly. Among the various papers read two at least deserve notice.

ITALIANS ABROAD

Is the title of a paper read on the 5th of February last by Signor Cristofero Negri, the learned President of the Italian Geographical Society. The author began by sketching the rise of the Venetian Republic, her commercial energy, and her struggles with the Genoese Republic. At the conclusion of the war, Venice still swayed the Levant, but on the shores of the Black Sea, and along the inland routes to Persia, the Genoese held their ground. But the fall of Constantinople proved their death-blow, and though the Genoese struggled bravely against Turks and Tartars, one by one their forts, which had guarded the road to Central Asia, fell. The Venetians who had been driven out from the Red Sea by the Portuguese and Turks, took to sending embassies to Poland, Russia, and Persia, with the object of forming treaties against the Turks. The accounts of these embassies, as well as of the missions to the Mongol princes, were not so well known as they deserved to be, and still lay buried among the Italian archives. As a proof of the extended commercial relations of the Italians, it may be mentioned that a short time back documents were discovered in the *Bibliotheca Riccardiana* proving that before Marco Polo's time a Florentine house of the name of Peruggi had regular agents in Peking. Accounts have been discovered of the mission of Florentines along the land route to India, with the object of securing a portion of the Indian traffic in diamonds and precious stones for Italy. Though the Venetian records suffered disastrously by fire, yet undoubtedly great treasures of historical geography lie in the libraries of Genoa and Pisa, as well as in the Anjou and Aragon archives of Naples and Palermo.

The question of Italian emigration and colonization at the present day, Signor Negri averred, was one which could not but possess interest for any one who had read these national records of former days. In 1849 Signor Negri took great pains to ascertain statistics of emigration through the consulates, but without success, no states except Sardinia possessing any suitable organization for the purpose. There was in fact little emigration, and that mostly from Sardinia. But in the course of years this increased, and the extension of consular agencies over the whole world enabled Signor Negri to make successful enquiries. From a mass of official and private replies to his queries, he arrived at the conclusion that the Italians settled abroad number between 400,000 and 500,000, and that about 40,000 yearly set sail from home or foreign parts. The greatest emigration takes place from Liguria, the Abruzzi, from some valleys of Piedmont, Upper Lombardy, Parma and the Basilicate. The stream flows mainly to La Plata, where they do well as sailors, fishermen and peasants. About 4000 gain their livelihood on the boards of theatres, and earn an aggregate annual income of about 20 million francs or £800,000. Scarcely one-seventh ever return home, but nevertheless from 3 to 4 million francs (£120,000 to £160,000) is yearly remitted home by them towards the support of their relations. On the west coast of America Italy possesses about a hundred craft, and no less than a thousand are engaged in inland navigation in South America. Much has been done of late years to protect the interests of Italian colonists abroad, and the effect has been to strengthen the ties between the mother-country and her children. There are remarkably few Italians in Russia (St. Petersburg alone excepted, where a small colony has existed since the time of Catherine II.), but it is probable that in the time of the Brothers Zeni, and in the days when Fioravante built in Moscow and girdled her with walls, the number was much larger. In Russian Poland the number is equally small, but in Odessa, Kertch, and along the shores of the Black Sea there has been, since the days of the first Napoleon, a thriving colony, who lived by coral fishing, and employed 2500 craft in the trade.

Along the shores of the Adriatic, Italians are of course to be found in great numbers, while in other parts of Austro-Hungary they amount to about 10,000. In Germany there are about 1400 only, and in Great Britain, spite of a small colony in London, the total num-

ber does not exceed 3000; but in France the number is as high as 90,000. In former times Spain and Portugal boasted a large number of Italian residents, but they have disappeared almost wholly from the latter place, and in the former they are restricted chiefly to Barcelona, Valencia, Malaga, Cadiz, and Seville, and barely exceed a thousand. In Gibraltar and Malta they form a large proportion of the entire population; in Patras there are a few settled as merchants, and in Athens a few as sculptors and architects. They muster very strong in Constantinople, Smyrna, and other Turkish towns. About 20,000 reside in Egypt and 10,000 in Tunis, making a total of 70,000 for the Ottoman Empire. Many too, have achieved distinction in Egypt; Brocchi, the geologist; Belzoni, well known for his antiquarian researches; Solucci Bey, the author of a great system of sanitary measures throughout Egypt; and Muzzi Bey, founder of the postal service. In Cyprus, the United States Consul-General Palma di Cesnola is a native of Turin, and is eminently versed in Assyrian, Greek and Roman antiquities.

Turning to Africa we find that the Italian colonies in Tripolitania hail chiefly from Tuscany; Catholic missions go thence as far south as lake Chad, one has lately been established in Western Sudan, while Padre Beltrame, known for his vocabulary of the Bari language, belonged to a mission in the Eastern Sudan. There are 8000 Italians in Algiers, the residue of a former emigration, but some of these who live by coral fishing are now suffering from some vexatious restrictions lately placed on this branch of industry. Marocco, Tangiers, and the Cape boast very few, but at some points along the Red Sea and in the Bogos country, it has more than once been proposed to establish trading or penal stations, in spite of Signor Negri's vigorous remonstrances. Apart from a few hundred missionaries in Persia, Bengal, Burma and China, there are no resident Italians in Asia to speak of. In Japan the number has increased, owing to the important trade in silkworms' eggs, which brings into Italy a profit of from 8 to 12 million francs per annum. About twenty years ago there was barely a single Italian vessel to be seen in East Indian waters, but now hundreds arrive in the course of the year. In Melbourne there are a very few Italian settlers, and a few scattered missionaries are to be found in other parts of Australia, in Tasmania, New Zealand, and Polynesia.

The United States boast about 70,000 Italians, who are chiefly to be found in Philadelphia, New York, Boston, Cincinnati, Chicago and New Orleans, while California owns about 10,000; all these come for the most part from South Italy. Constantino Beltrame, it will be remembered, discovered the sources of the Mississippi. Fewer in number are those in Mexico and the five Central American republics, but among them rank the names of Floresi and Moro, well known for their schemes of communication across the isthmi of Panama and Tehuantepec. In the West India Islands, in Northern Brazil, and in the harbours of Columbia, Venezuela and the Equator, there are a few scattered Italians; among these, Colonel Codazzi is known for his exploration of Venezuela. They are so plentiful in South Brazil, Uruguay, and the Argentine Republic, that there is a talk of this region proving eventually an Italian America; one-third of the entire population (84,000) of Buenos Ayres, and the whole of that of Rosario, consists of Italians, while a few colonies have been formed at the mouths of some of the Patagonian rivers. There are but a few in Chili and Bolivia, but in Peru they muster about 13,000 in number, Professor Raimondi being conspicuous among them for his geographical attainments.

Comparing them with the Germans, we find the latter predominant in the north of Europe, in Asia, America, the interior of Russia, in Poland, Austro-Hungary, Great Britain, the Netherlands, Belgium, the West Indies, South Africa, Australia, Polynesia, the East Indies, China, and the Amur region. In the Eastern and Central States of America the Germans are twenty times as numerous as the Italians, while in California this disparity partly disappears. In Mexico, Central America, Columbia and North Brazil, Italians rival Germans in numbers, while in South Brazil, Chili, Peru, and La Plata, as well as along the Mediterranean and Black Sea coasts they outnumber them.

Emigration from Italy is, in point of numbers, about a quarter of that of Germany, but it is increasing yearly. Half of the emigrants are mountaineers and hardy peasants, who only speak a sort of *patois*, and are almost wholly destitute of means. The prohibition of emigration, so as to supply recruits for the army, has been talked of, but never put into practice. Emigrant ships are subject, as in Germany, to certain regulations, affecting their provisioning and against over-loading; but these, unfortunately, are not strictly acted upon. Italy has concluded treaties of trade and navigation with every power of consequence, with the exception of Zanzibar, Muskat, and Bolivia, and with most states there are consular conventions which prescribe a certain sphere of action to the agents. About 100 consulates are provided with Italian officers, all of whom are well versed in legal experience, those in the Levant, according to Signor Negri, ranking higher in this respect than those of other countries.

Italian navigation is small, but increasing. During the year 1873, 10 Italian vessels arrived in the St. Lawrence River, 421 in New York, 200 visited Buenos Ayres, 100 sailed up the Parana, 200 anchored in East Indian waters, and 65 entered up the Elbe and Weser, but in St. Petersburg the number did not exceed 17. There is a weekly newspaper published in Rome, called *Il Giornale delle Colonie, Organo degli interessi Italiani all'estero*, which, as its name implies, deals with Italian interests abroad.

Signor Negri considers that though Hamburg is closely connected with German colonies abroad, and though all the material for a colonial parliament. should such a project be thought of, exists there, the rest of the German empire does not care to interest itself in the welfare of its children. No census of Germans living out of Europe appears ever to have been made, or any systematic inquiries respecting their condition, prosperity, and mode of obtaining a livelihood set on foot. No register of the deaths are kept in the consular agencies, and no subscriptions of any consequence appear to have been made on behalf of their wounded countrymen in the late war by German colonists. There is no other nation, in Signor Negri's opinion, not even the English, which makes such strides in geographical exploration; but in all their descriptions of travels, statistical maps, &c., we look in vain for a reference to their brethren living at a distance from the mother country. The achievements of a Nachtigall, a Brenner, a Von Richthofen, in the path of discovery, make it most desirable that either a private or public scheme should be set on foot with the object of strengthening the bonds between the mother country and her children abroad.

———:o:———

THE DUTCH GEOGRAPHICAL SOCIETY.

WE have received the second number of the *Tijdschrift van het Aardrijkskundig Genootschap*, which shows how firmly rooted the Dutch Society has already become; and that good fruit may be expected from it. The number of members is increasing, and the finances of the Society are in a most flourishing condition. The present number contains an account of the proceedings of the meetings on the 28th of February and the 11th of April, the former held at the Hague, and the second at Amsterdam; at both of which Prince Henry of the Netherlands presided. The proceedings

of the February meeting opened with a paper on New Guinea, by Herr P. J. B. C. Robidé van der Aa, in which he showed how little is yet known of this remarkable island, and how much of that little is due to the enterprise of the early Dutch navigators. In the discussion which followed the reading of the paper, Herr A. D. van der Gon Netscher gave some account of his voyage to the coast of New Guinea in the ship 'Diana,' in the year 1836; and of his ascent, for some miles, of a river which empties itself into Triton Bay. Then followed an important paper by Dr. D. J. Steyn Parvé, on geography as a branch of study at the Universities. In the subsequent discussion, Dr. Kan and other speakers expressed their full concurrence in the views of the author of the paper.

The second meeting of the year (the fourth since the inauguration of the Society) took place at Amsterdam; when Price Henry was in the chair. The Secretary read a report on the finances of the Society; after which Herr N. W. Posthumus gave a short account of the life and character of Miss Tinné, and of the results of her travels. Prince Henry exhibited a photograph of this adventurous lady. Dr. C. M. Kan then read a letter, just received from Berlin, from Dr. Koner, the Secretary of the African Association, giving a brief account of the progress of the German Congo Expedition. Dr. Güssfeldt had ascended the Quillo River to the last Dutch factory, and penetrated into the district of Yangela, which is the commencement of a mountainous region. The proceedings closed with a paper by Herr Veth on the increase of geographical knowledge, especially during the past year. In the course of his remarks he paid a just tribute to the memory of Maury, and expressed a hope that a suitable monument to this great benefactor of the seamen of all nations might be erected, in the shape of a lighthouse on the coast of Brazil. Herr Veth also noticed the labours of Livingstone and Garnier. In reviewing the publications which have for their object the diffusion of geographical knowledge, the eminent Dutch *savant* mentioned, with generous appreciation, the *Geographical Magazine*, Signor Guido Cora's *Kosmos*, and Petermann's *Mittheilungen*. He justly praised the beauty of the maps which illustrate Signor Cora's publication.

The *Tijdschrift* contains the papers of Dr. Steyn Parvé and Herr Veth in full; and an address to the Home Minister, signed by Herren Veth and Kan on the part of the Geographical Society, urging the importance of making geography a branch of study at the universities. There is also a detailed notice of Francis Garnier; and a historical and topographical account of the Dutch West Indian Island of St. Eustathius, illustrated by a carefully executed map.

M. M.

——:o:——

MEXICAN GEOGRAPHICAL SOCIETY.

A NEW series of the publications of the Mexican Geographical and Statistical Society was commenced from January 1873, and with it the labours of the Society have been extended and rendered more efficient. Indeed, the Society has become a very important national institution, and bids fair to be a prolific source whence useful suggestions for administrative action will emanate. The Minister of "Fomento" is now *ex officio* President; and there are branch committees in the capitals of all the States of the Federation. The new energy which has been infused into the Society is due to the learned Vice-President Don Ignacio Ramirez, and to the able and accomplished Secretary Don Ignacio Altamiraus. Meetings now take place every week during the session and the proceedings of the Society are published on the 2nd of each month. They are in octavo form, instead of the quarto shape of the old series, in order to facilitate transmission to Europe, and each issue contains sixty-four pages besides maps and other illustrations. The proceedings of the meetings are given (a new feature), as well as original communications and translations. The latter keep Mexican geographers informed of what is being done by their fellow labourers in other parts of the world. Thus the papers and reports on Dr. Livingstone's discoveries are translated from the *Proceedings of the Royal Geographical Society*, the account of the Upper Amazon, by the Abbé Durand, from the French *Bulletin*, and a sketch of recent Arctic discoveries from other sources.

The issues for 1873 also contain several original papers of great value. There is one on the State of Mexico, which is arranged on a plan similar to that adopted for the Administration Reports of the Indian Local Governments. It comprises much well digested statistical information, systematically arranged; and it is intended to organise a scheme by which similar information shall be collected and classified, from the other States of the Mexican Federation. Another paper is on the great importance of forest conservancy, by Don Manuel Balbontin, and a plan has been elaborated for making a complete collection of Mexican woods, with a view to the conservancy of the trees yielding those which are most useful. Each specimen is to be accompanied by a botanical identification, native name, account of the habitat, and of the local uses. There were other papers, during 1873, on agricultural and mining subjects; and an elaborate scheme for the classification of mining statistics.

One custom of the Mexican Geographical Society is to have an annual solemn celebration in honour of some departed worthy. In 1872 there was a meeting of this kind, at which Don Sebastian Lerdo de Fejada, the President of the Republic, took the chair, in memory of Professor Samuel Morse, the American inventor of the electric telegraph. The number of the *Proceedings* which records it contains a portrait of Professor Morse, an obituary address by the Secretary, a poem, and a detailed report on the telegraphic lines in the Mexican Republic, with a very creditable illustrative map. In 1873 the same honours were shown to the memory of Copernicus, when a discourse was delivered by Señor Romero, which is published in the *Proceedings*, with a portrait.

NOTICE.

The Office of THE GEOGRAPHICAL MAGAZINE *is at* 57 & 59, *Ludgate Hill, E.C.*

Manuscripts sent to the Editor cannot be returned, nor can the Editor be responsible for them.

Letters and Articles intended for insertion should be written on one side of the paper only, and must be accompanied by the name and address of the writer; not for publication, but as a mark of good faith.

The right of translation is reserved.

Annual Subscription and Postage, 26s., Inland. Foreign Orders must be accompanied by P.O.O. or Cheques to include the full amount of Foreign Postage. Post Office Orders to be made payable to Messrs. Trübner & Co., 57 & 59, Ludgate Hill, London, E.C.